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Giver, Sören Bo  
Awapatent AB,  
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2000 -01- 31

AWAPATENT, Malmö

Datum/Date

27. 01. 00

Zeichen/Ref./Ref.	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.
2981378	98201555.4-2303/0877130
Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire	
Välinge Aluminium AB	

TRANSMISSION OF THE CERTIFICATE FOR A EUROPEAN PATENT  
PURSUANT TO RULE 54 (1) EPC

The certificate for a European patent, with the  
specification annexed thereto, is enclosed herewith.

G. TERNIEDEN  
Formalities Officer  
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# Urkunde Certificate Certificat

Es wird hiermit bescheinigt, daß für die in der beigefügten Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

It is hereby certified that a European patent has been granted in respect of the invention described in the annexed patent specification for the Contracting States designated in the specification.

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet ci-joint, pour les Etats contractants désignés dans le fascicule de brevet.

Europäisches Patent Nr.	European Patent No.	Brevet européen n°
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0877130

Patentinhaber

Proprietor of the Patent

Titulaire du brevet

Välinge Aluminium AB  
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260 40 Viken/SE

München, den  
Munich,  
Paris à Munich, le

26.01.00

Ingo Kober

Präsident des Europäischen Patentamts  
President of the European Patent Office  
Président de l'Office européen des brevets

EPA/EPO/OEB Form 2031 01.96

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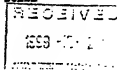
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Deputy/Date

16/12/99

Inventor/Inventor 2981378	Application No./Application No./Demande n°/Patent No./Brevet n° 98201555.4-2303 0877130
Applicant/Applicant/Demandeur/Patentinhaber/Proprietar/Titulaire Vélings Aluminium AB	

# DECISION TO GRANT A EUROPEAN PATENT PURSUANT TO ARTICLE 97(2) EPC

Following examination of European patent application No. 98201555.4  
 a European patent with the title and the supporting documents indicated  
 in the communication pursuant to Rule 51(4) EPC dated 11.08.99  
 is hereby granted in respect of the designated Contracting States.  
 Any modifications which were subsequently requested have been approved  
 by the Examining Division. Any corrections requested by the applicant  
 a f t e r receipt of the communication under Rule 51(6) and received at  
 the EPO on 00.00.00 have been taken into account.

Patent No. : 0877130  
 Date of filing : 29.04.94  
 Priority claimed : 10.05.93/SE 9301595  
 Designated Contracting States  
 and Proprietor(s) : AT-BE-CH-DE-DK-ES-FR-GB-GR-IE-IT-LI-LU-  
 MC-NL-PT-SE  
 Vélings Aluminium AB  
 Kyrkogård 1  
 260 40 Viken/SE

This decision will take effect on the date on which the European  
 Patent Bulletin mentions the grant (Art. 97(4) and (5) EPC).

The mention of the grant will be published in European Patent  
 Bulletin 00/04 of 26.01.00.

Examining Division  
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PAPADIMITRIOU S E

PLUGGE H B



Registered letter

EPO Form 2006 01.95

7051001

to EPO postal service: 11/12/99



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1999-10-04

AWAPATENT, Malmö

Datum/Date

30.09.99

JUL 20 2001

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2981378

Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.

98201555.4-2303/

anmeldet/Applicant/Demandeur/Patentnehmer/Propriétaire/Titulaire

Välinge Aluminium AB

# COMMUNICATION UNDER RULE 51(6) EPC

Further to the communication under Rule 51(4) dated 11.08.99

your approval of the text to be used as the basis for grant has been duly received.

Insofar as you have not already fulfilled the requirements mentioned below, you are now requested within a non-extendable period of three months from notification of this communication

- to file in duplicate translations of the claim(s) in the two other EPO official languages;
- to pay the fee for grant including the fee for printing up to and including 35 pages;  
Reference 007 ..... 715.00 6440.00
- to pay the printing fee for the 36th and each additional page; Number of pages: 0  
Reference 008 ..... 0.00 0.00
- to pay the additional claims fee(s)  
(Rule 51(7) EPC);  
Number of claims fees payable: 0  
Reference 016 ..... 0.00 0.00  
Total amount ..... 715.00 6440.00

\*) Translations received by the EPO on 18/09/99.

REGISTERED LETTER

18/9-99

Ingen





If the equivalents are given in other currencies, then these come under the provision of possible changes in accordance with Art. 6(4) of the Rules Relating to Fees. Such changes will be published in the Official Journal.

For all payments you are requested to use EPO Form 1010 or to refer to the relevant reference number.

If additional copies of the patent specification are required, you should request this in writing and quote Fee reference code 0 5 8 when making payment.

If the grant, printing or claims fees are not paid or the translations not filed in due time, the European patent application will be deemed to be withdrawn (Rule 51(8) EPC).

Note on payment of renewal fees

If a renewal fee falls due between notification of the present communication and the proposed date of publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee has been paid (Rule 51(9) EPC).

Under article 86(4) EPC, renewal fees are payable to the European Patent Office until the year in which the mention of the grant of the European patent is published.

#### Filing of translations in the Contracting States

Pursuant to Article 65(1) EPC the following designated Contracting States require a translation of the specification of the European patent in their/one of their official language(s) (Rule 51(10) EPC).  
i n s o f a r this specification will not be published in their/one of their official language(s)

- within t h r e e months of publication of the mention of such decision:

AT AUSTRIA  
BE BELGIUM  
CH SWITZERLAND/LIECHTENSTEIN  
DE GERMANY  
DK DENMARK  
ES SPAIN  
FR FRANCE  
GB UNITED KINGDOM  
GR GREECE

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IT ITALY  
NL NETHERLANDS  
PT PORTUGAL  
SE SWEDEN

- within a maximum of six months of publication of the mention of such decision:

IE IRELAND

The date on which the European Patent Bulletin publishes the mention of the grant of the European patent will be indicated in the decision on the grant of the European patent (EPO Form 2006).

In case of a valid extension the following Extension States require a translation of the CLAIMS in their official language within three months after publication of the mention of the grant of the European patent:

AL ALBANIA  
LT LITHUANIA  
LV LATVIA  
MK MACEDONIA  
RO ROMANIA (requires translation of the specification)  
SI SLOVENIA

The translation must be filed with the national Patent Offices of the Contracting or Extension States in accordance with the provisions applying thereto in the State concerned. Further details (e. g. appointment of a national representative or indication of an address for service within the country) are given in the EPO information brochure "National law relating to the EPC", edition January 1997, and in the supplementary information published in the Official Journal of the EPO.

Failure to supply such translation to the Contracting and Extension States in time and in accordance with the requirements may result in the patent being deemed to be void ab initio in the State concerned.

Note to users of the automatic debiting procedure:

Unless the EPO receives prior instructions to the contrary, the fee(s) will be debited on the last day of the period for payment. For further details see the Arrangements for the automatic debiting procedure, Supplement to OJ EPO 06/1994.

For the Examining Division:

IDF F G C  
Tel. No.: (+49-89) 2399-2449



[ ] The text notified under Rule 51(4) EPC has been amended by the Ex-

Anmeldung Nr./Application No./Demande n° // Patent Nr./Patent No./Brevet n°	Blatt/Page/Feuille
98201555.4	3



amining Division as requested by the applicant.  
Copies of the amended pages are annexed.

- [ ] The text notified under Rule 51(4) EPC has been amended using the replacement pages filed by the applicant.
- [ ] Form 2530 relating to filing a translation of the previous application is dispatched by the same post.

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Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°	Blatt/Page/Feuille
98201555.4	4

EPO Form 2005 01.98 Registered letter 7005004 27/09/99



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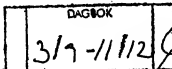
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H36.

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200 71 Malmö  
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Application No. 98 201 555.4-2303	Ref. 2981378	Date 11.08.99
Applicant Vålinge Aluminium AB		

Communication under Rule 51(4) EPC

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

Description, pages:

1-19 as originally filed

Claims, No.:

1-9 as originally filed

Drawings, sheets:

1-6 as originally filed

A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2056.

You are requested to state your approval of the text specified above within four months of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 1995, 841.

104220-4425006



Date

11.08.99

Sheet 2

Application-No.: 98 201 555.4

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 187(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4.

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Himmel, U  
For the Examining Division  
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Enclosure(s): Form 2056  
4.5 Copies of the relevant documents

T0222-44750006



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P.O. Box 5117  
200 71 Malmö  
SUEDE

Application No. 98 201 555.4-2303	Ref. 2361378	Date 11.08.99
Applicant Välinge Aluminium AB		

For the intended grant of a European patent, (1) the title of the invention in the three official languages of the European Patent Office, (2) the International Patent Classification, (3) the designated Contracting States and (4) the applicant's registered name, address and country of residence or principal place of business are set out below.

- (1)
- Ein aus einer Vielzahl von mechanisch miteinander verbundenen Paneelen zusammengesetzter Fussboden
  - A flooring system comprising a plurality of floor panels which are mechanically connected to each other
  - Plancher composé de panneaux de revêtement reliés mécaniquement les uns aux autres
- (2) E04F15/14, E04F15/02, E04F13/08
- (3) AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE
- (4) Välinge Aluminium AB  
Kyrkogård 1  
260 40 Viken  
SE

98005744-022701

# 15.05.98

FLOORING SYSTEM

Technical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

- 5 More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one panel.

- The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

25 Background of the Invention

- A joint of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and grooves. The locking device for the second mechanical  
30 connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint

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FLOORING SYSTEMTechnical Field

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- and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful for joining thick floor panels to form surfaces of a considerable expanse.

- Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels employed are laid as "floating floors" without being attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in the groove and forcing the floor panels together. The tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board, and a base layer to balance the construction. The core has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall thickness must be at least about 7 mm. These known laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

- First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

- Second, the core must be made of moisture-absorbent material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the floors thinner using so-called compact laminate, because

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of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

- Third, since the laminate layer of the laminated floors is highly wear-resistant, tool wear is a major problem when working the surface in connection with the formation of the tongue.

- Fourth, the strength of the joint, based on a glued tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in air humidity.

- Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to every panel on both the long and short sides thereof.

- Sixth, it is not possible to disassemble a glued floor once laid, without having to break up the joints. Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out panels be replaced without extensive efforts, which would be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

- Seventh, known laminated floors are not suited for such use as involves a considerable risk of moisture penetrating down into the moisture-sensitive core.

- Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam or the like, which is to damp impact sounds and to make the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

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must be placed in edge-to-edge fashion. Different underlays affect the properties of the floor.

There is thus a strongly-felt need to overcome the above-mentioned drawbacks of the prior art. It is however not possible simply to use the known joining technique with glued tongues and grooves for very thin floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is no viable alternative either. Especially, biased clips of this type cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in con-

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nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

- A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

- A particular object of the invention is to provide a panel-joining system which
- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
  - can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
  - makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
  - allows joining all the edges of the panels;
  - reduces tool wear when manufacturing floor panels with hard surface layers;

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- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- 5 - makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

10 These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

- 15 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

20 a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge

25 of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

that the locking device further comprises a strip integrated with the other of said panels, termed strip

30 panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with

35 its locking element received in the locking groove of the groove panel,

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- that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and
- 5 is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

- that the second mechanical connection is so conceived as to allow the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip.
- 10

- The term "rear side" as used above should be considered to comprise any side of the panel located behind/ underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion of the joint edge.
- 15
- 20
- 25

- It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can counteract or prevent such displacement and/or upward angling.
- 30
- 35

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The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-

5 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-

assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking

10 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a system is provided which permits precise joining of thin floor panels having, for example, a thickness of the order of 3 mm and which at the same time

15 provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip panel and which exhibits an exact, predetermined distance from its bottom to the front side of the strip panel. The

20 part of the strip projecting behind the groove panel engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance from its bottom to the front side of the groove panel.

25 The thickness of the strip then is at least so great that the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This

30 levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material

35 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an alu-

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minium strip, sufficient strength can be achieved with a strip thickness of the order of 0.5 mm.

- In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of the invention is characterised in that when the groove panel is pressed against the strip panel in the second direction and is turned angularly away from the strip, the maximum distance between the axis of rotation of the groove panel and the locking surface of the locking groove closest to the joint edges is such that the locking element can leave the locking groove without contacting the locking surface of the locking groove. Such a disassembly can be achieved even if the aforementioned play between the locking groove and the locking surface is not greater than 0.2 mm.

- According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

- For optimal function of the invention, the strip and the locking element should be formed on the strip panel with high precision. Especially, the locking surface of the locking element should be located at an exact distance from the joint edge of the strip panel.

- Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

- By known manufacturing methods, it is possible to produce a strip with a locking pin, for example by extruding aluminium or plastics into a suitable section, which is thereafter glued to the floor panel or is inserted in special grooves. These and all other tradi-



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- tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the strip panel.

- The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

- Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

- In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

- The above and other features and advantages of the invention will appear from the appended claims and the following description of embodiments of the invention.

H 15.15.98

The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

#### Description of Drawing Figures

- 5 Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.
- 10 Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.
- Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.
- 15 Figs 4a and 4b show a floor panel according to Figs 2a-c as seen from below and from above, respectively.
- Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.
- 20 Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.
- Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

#### Description of Preferred Embodiments

- 25 Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in
- 30 practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1 having

H 15.12.98

a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

- To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

- Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

- From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

- Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

- As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

- The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has

H 15.05.98

a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action.

As appears from Figs 4a and 4b, each panel in the system has a strip 6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

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nection can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

- The strip 6 is mounted in a tolerance-equalising groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel 2 has a corresponding tolerance-equalising surface or groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the strip 6 is so chosen that the underside 44 of the strip is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently transmitted to the subfloor 12 without any stresses being exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels. Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.

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FIG. 15

- Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24.
- 10 The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising
- 15 distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail
- 20 from below in the perspective view of Fig. 6.

- Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the
- 25 underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.

- The embodiment of Figs 2a-c is further characterised
- 30 in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2 towards the subfloor 12 (Fig. 2b), as well as a portion 36
- 35

H 15.15.98

which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

- Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

- Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

- Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint edges 3, 4 have been brought into complete engagement

H 1515.98

with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip panel 1, the projecting part of the strip 6 thus forming



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an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of pan-

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els in all four directions with respect to the initial position.

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## CLAIMS

1. A flooring system, comprising a plurality of rectangular floor panels (1, 2), which are mechanically connectable to each other in parallel rows along adjacent long edges (3, 4) and short edges (3', 4'), respectively, of the panels, said floor panels being provided with means for mechanically locking together their long edges (3, 4) as well as their short edges (3', 4') in a first direction (D1) at right angles to the principal plane of the panels, thereby forming first mechanical connections between the panels (1, 2),

characterised in

that each panel, at a rear side thereof, being provided:

(i) with a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being integrally formed in one piece with the panel (1, 2) and forming an extension of a lower part of the corresponding edge of the panel (1, 2) and extending throughout substantially the entire length of the corresponding edge of the panel and being provided with a projecting locking element (8), and

(ii) with a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4'), each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel (1, 2), said locking strips (6, 6') and locking grooves (14, 14') forming second mechanical connections locking the panels to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4; 3', 4'), such that a strip (6, 6') of a first one (1) of two joined panels projects on the rear side of the second

H 15.21.15.98

panel with its locking element (8) received in the locking groove (14, 14') of the second panel (2),

that the first mechanical connection allows mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the panels, when joined together along their long edges (3, 4), can occupy a relative position in said second direction (D2) where a play ( $\Delta$ ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is facing the long edges (3, 4), such that also the second mechanical connection allow mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the second mechanical connection along the long edges (3, 4) is so conceived as to allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the locking groove (14) is turned about its long edge (4) angularly away from the strip (6), and

that each locking strip (6') at the short edges (3', 4') is flexible and resilient such that two panels (1, 2), having already been mechanically joined to a common long edge of a third panel, can be mechanically joined together at their adjacent short edges (3', 4') by displacing said two panels horizontally towards each other, while resiliently urging the flexible strip (6') at one (3') of said short edges downwards, until said adjacent short edges (3', 4') of the two panels (1, 2) have been brought into complete engagement with each other horizontally and the locking element (8) at said one short edge (3') thereby snaps into the locking groove (14') at the second short edge (4').

2. A flooring system as claimed in claim 1, characterised in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the

H 15.21.05.98

locking element (8) to enter the locking groove (14) if the panel (2) associated with the groove (14) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper part of the joint edge (4) of the

5 panel (2) associated with the groove in contact with the upper part of the joint edge (3) of the adjacent panel (1) associated with the strip.

3. A flooring system as claimed in claim 1 or 2,

10 c h a r a c t e r i s e d in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the groove is turned about

15 its joint edge (4) angularly away from the strip (6) while holding the upper part of the joint edge (4) of the panel (2) associated with the groove in contact with the upper part of the joint edge (3) of the adjacent panel (1) associated with the strip.

20

4. A flooring system as claimed in any one of the preceding claims, c h a r a c t e r i s e d in that, in order to resiliently urging the flexible strip (6') downwards while displacing said adjacent short edges (3',

25 4') horizontally towards each other, said adjacent short edges (3', 4') being provided with cooperating lower and upper bevels (70, 72), such that the panels (1, 2) are forced to move vertically towards each other when their adjacent short edges (3', 4') are moved up to each other

30 and the panels (1, 2) are pressed together horizontally.

5. A flooring system as claimed in any one of the preceding claims, c h a r a c t e r i s e d in that the locking surface (10) of the locking element (8) is

35 extended from the front side (22) of the strip (6, 6') through a height in said first direction that is less than or equal to 2 mm.

H 15.05.98

6. A flooring system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6, 6').

7. A flooring system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels (1, 2).

8. A flooring system as claimed in claim 7, characterised in that the underlay (46) is fixed so as to cover the strip (6, 6') in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels (1, 2) is offset in said second direction relative to the joint edges (3, 4; 3', 4').

9. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip (6, 6') between the locking element (8) and the joint edge (3, 3') of the panel (1) associated with the strip to seal against the other panel (2).

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2/6

Fig. 2a

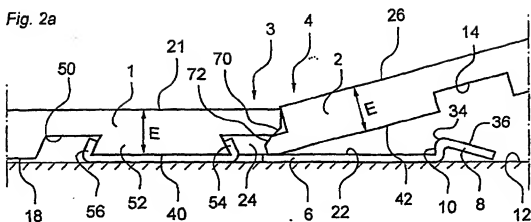


Fig. 2b

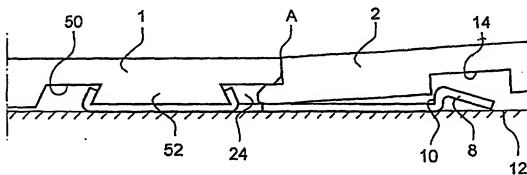
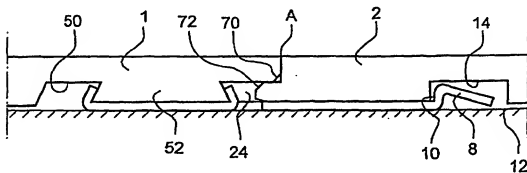


Fig. 2c





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3/6

Fig. 3a

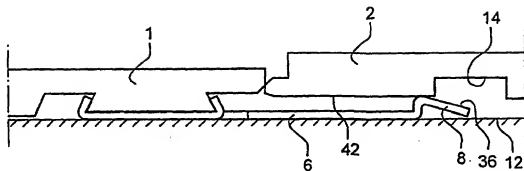


Fig. 3b

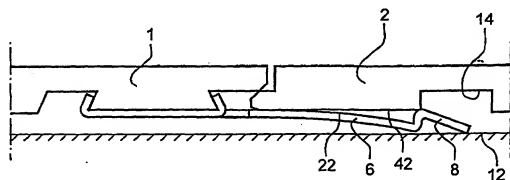
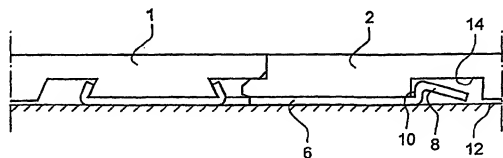


Fig. 3c



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4/6

Fig. 4a

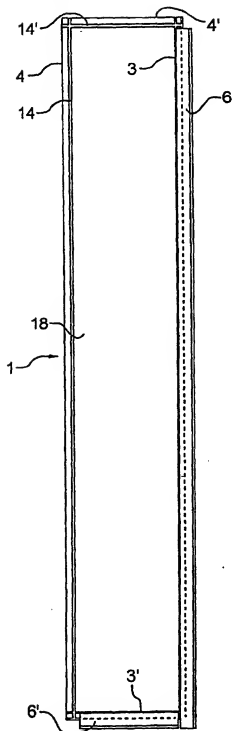
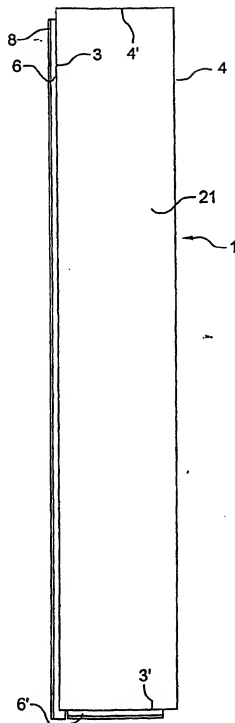


Fig. 4b

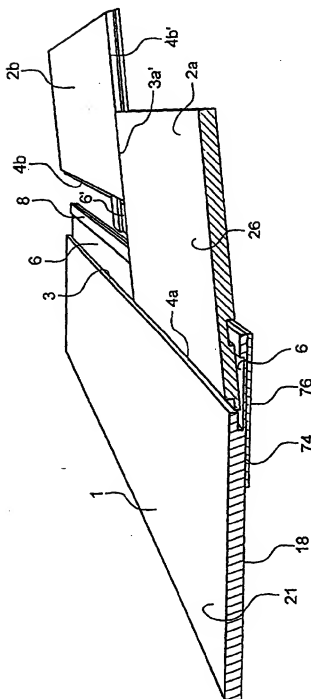


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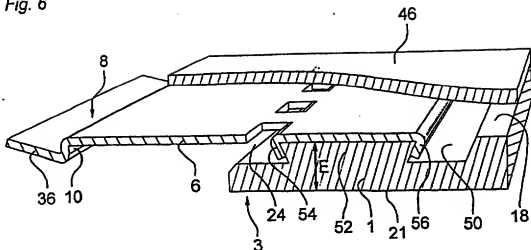
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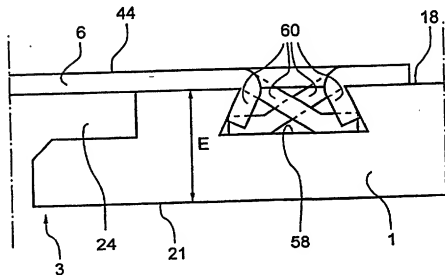
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6/6

**Fig. 6**



**Fig. 7**



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Bemerkungen - Remarks - Remarques

EP applications 98108535.2-2303 and 98201555.4-2303 in the name  
of Välinge Aluminium AB

Reference is made to our telephone conversation.

Please find attached a copy via fax of the EPO Form 2004 for both  
applications.

The original letters will leave the EPO per registered mail on 11/08/99.

Best regards and nice weekend.

6.08.1999

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Application No. 98 201 555.4-2303	Ref. 2981378	Date 11.08.99
Applicant Välinge Aluminium AB		

## Communication under Rule 51(4) EPC

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

Description, pages:

1-19 as originally filed

Claims, No.:

1-9 as originally filed

Drawings, sheets:

1-6 as originally filed

A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2058.

You are requested to state your approval of the text specified above within four months of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to CJ EPO 1995, 841.

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Date

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Sheet 2

Application-No.: 98 201 555.4

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 167(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4.

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Himmel, U  
For the Examining Division  
Tel. No.: (+49-89) 2399-2449

Enclosure(s): Form 2056  
4.5 Copies of the relevant documents

90005744-022701



## AWAPATENT

Helsingborg  
11 June 1999

Our ref.  
EP-2981378

Handled by  
Sören Giver/MY

Attention  
DG 2

EUROPEAN PATENT OFFICE  
D-80298 MÜNCHEN

**SENT BY REGISTERED MAIL**

European Patent Application No 98201555.4-2320  
in the name of VÄLINGE ALUMINIUM AB  
Divisional of EP 0 698 162

Dear Sirs,

This is in response to your Communication dated 1 June 1999.

The present application is a divisional application, based on parent application No. 94915725.9.

Referring to the objection set out in your Communication, it is respectfully submitted that there should be no double patenting problems in the present case for the following reasons:

Parent application EP 0 698 162 (now granted) includes claims 1-22 of which all are directed to a system for providing a joint along adjacent joint edges of two building panels. Claim 1 is the only independent claim.

The other pending divisional application EP 0 855 482 does not include any apparatus claims. It includes method claims only, directed essentially to methods for mechanically assembling floor panels. Thus, the parent application and EP 0 855 482 relate to different inventions, although these inventions presents some common features.

HELSINGBORG VAT No. SE556082702301

**Other AWAPATENT offices:**

**STREET ADDRESS.**  
Borga allé 1  
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**POSTAL ADDRESS:**  
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S-254 52 HELSINGBORG  
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Fax +46 42 16 09 42  
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**MALMÖ** (Head office and registered office)  
**STOCKHOLM** **GÖTEBORG**  
**SÖDERHAMN** **VÄXJÖ**  
**LIDKÖPING** **VARBERG**  
**ÖSTERSUND**

100945-11 14:17 C:\Paf\N\B\V\hmg\Umg\dm\mg\Systems\FCU\Integrated\29813\8HP\NLE\G\A\F\2\RESP000611.doc

Copied from 90005744 on 05/18/2006



The present divisional application EP 0 877 130 includes claims 1-9 directed to a flooring system, comprising a plurality of rectangular floor panels, which are mechanically connectable to each other. There is only one independent claim.

According to EPO's Guidelines, a European parent application and a European divisional application may not claim the subject-matter. It is also stated in the Guidelines that one application may claim its own subject-matter in combination with that of the other application.

Furthermore, in BoA Decision T 91/118, point 2.4.1, the Board states that it can find no support for the contention that features forming part of the subject-matter of the divisional application cannot be the subject of a dependent claim in the parent application.

In the present case, the situation is as follows:

In the parent application, (i) the embodiment wherein the strip is formed as a separate component fixedly connected to the panel body forms the subject-matter of claim 5, whereas (ii) the embodiment wherein the strip is integrally formed with the panel body, i.e. formed in one piece therewith forms the subject-matter of claim 14. Claim 5 is only dependent from any of claims 1-4. Claim 14 is only dependent from any one of claims 1-4.

Furthermore, the parent application includes a claim 13 directed to an embodiment wherein the strip is made of a flexible, preferably resilient material. However, claim 13 is only dependent from any one of claims 5-12.

Thus, the claims of the parent application does not claim the combination of the subject-matter in claim 1 plus the subject-matter of claim 14 ("one-piece embodiment") plus the feature that the strip is made of a flexible, preferably resilient material. This combination of features is what is claimed in claim 1 in the present divisional application. Accordingly, it is respectfully submitted that the parent application and the present divisional application does not claim the same subject-matter, although some features forming part of the subject-matter of the divisional application are the subject of different claims in the parent application.

As to the necessary support in the parent application (Article 76, EPC), it is stated in the parent application (page 8, line 34) that the strip may consist of a material which is flexible and resilient.

Yours faithfully,



Sören Givert  
Authorised Representative  
AWAPATENT AB

90005744-022701



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W +49 89 2399-0  
TX 523 856 upmu d  
FAX +49 89 2399-4445

Europäisches  
Patentamt

Generaldirektion 2

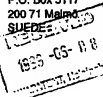
European  
Patent Office

Direction Générale 2

Office européen  
des brevets

Direction Générale 2

Giver, Sören Bo  
Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SWEDE



Telephone Numbers:

Primary Examiner (+49-89) 2399-2486  
(substantive examination)

Formalities Officer / Assistant (+49-89) 2399-2438  
(Formalities and other matters)



Application No. 98 201 555.4-2303	Ref. 2981378	Date 01.06.99
Applicant Välinge Aluminium AB		

Communication pursuant to Article 96(2) and Rule 51(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(3) and 83(2) and (4) EPC.

Amendments to the description, claims and drawings are to be filed where appropriate within the said period in three copies on separate sheets (Rule 38(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



PLUGGEHB  
Primary Examiner  
for the Examining Division

Enclosure(s): 1 page/s reasons (Form 2906)



Bescheid/Protokoll (Anlage)

Communication/Minutes (Annex)

Notification/Proclamation-verbal (Annexe)

Datum  
Date  
Date

01.03.99

Blatt  
Sheet  
Feuille

1

Anmelde-Nr.:  
Application No.:  
Demos: n°:

98 201 555.4

The examination is being carried out on the following application documents:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

**Description, pages:**

1-19 as originally filed

**Claims, No.:**

1-9 as originally filed

**Drawings, sheets:**

1-6 as originally filed

90005744-022701

1. The present application claims priority to 10.5.1993 (SE9301595), as does pending divisional application EP0855482 and its parent EP0698162.

As set out in the Guidelines, the Convention does not deal explicitly with the case of co-pending European applications of the same effective date. However, it is an accepted principle in most patent systems that two patents shall not be granted to the same applicant for one invention. It is permissible to proceed with two applications having the same description where the claims are quite distinct in scope and directed to different inventions.

In the present case, there are three European applications from the same applicant designating the same States and the claims of those applications have the same priority date and relate to essentially the same invention, at least in respect of the present application and EP0698162.

The applicant is requested to amend the present application in such a manner that it no longer claims the same invention, and to indicate clearly the differences between the presently claimed invention and that of EP0698162.



P. B. 5816 - Patentaan 2  
2280 HV Rijswijk (234)  
TX (070) 3 40 20 40  
FAX (070) 2 40 30 16

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Patentamt

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Patent Office

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Giver, Sören Bo  
Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE

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1998 -10- 19

AWAPATENT Malmö

Datum/Date

12/10/98

inven/Ref./Réf.

2981378

Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.

98201555.4-2303

Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire

Välinge Aluminium AB

# REFUND OF FEES

The following fees were paid in respect of the application 98201555.4

Fee	Code	Voucher No	Date	Currency	Amount
SEARCH FEE	002	00594113	12/05/98	DEM	1 700,00

# REFUND ORDER

- According to Art. 10 Rules relating to Fees (compare also OJ EPO 1980, 112) 50 % of the search fee will be refunded.
- The refund will be done by :  
CREDIT OF THE AMOUNT DUE TO THE DEPOSIT ACCOUNT NO.  
28100022 - AWAPATENT AB

Sum refundable	Code	Currency	Amount	Voucher No
	002	DEM	850,00	697203

The Authorising Officer  
SCHUBERT K P  
(070)3402979



Original lämnad till AW / AW

**AWAPATENT**Handläggs av  
Sören Giver/MPHelsingborg  
1998-10-07Vår referens  
2981378Attention  
DG 2

European Patent Office

D-80298 MÜNCHEN

SENT BY FAX (089) 23 99 4465

VÄLINGE ALUMINIUM AB  
European Patent Application No. 98201555.4  
Publication No. 877 130

Dear Sirs,

An accelerated examination under the PACE program is hereby respectfully requested in the above-identified case.

Very truly yours,

Sören Giver  
Authorised Representative  
AWAPATENT AB

90005744.022701

HELSINGBORG		Org. nr. 556082-7023		Övriga AWAPATENT-kontor:	
GATUADDRESS: Berga allé 1 HELSINGBORG	POSTADDRESS: Berga allé 1 254 52 HELSINGBORG	Telefon	042-16 30 45	MALMÖ (Huvudkontor och styrelsens säte)	
		Fax	042-16 09 42	STOCKHOLM	GÖTEBORG
		Epost	mail@awapatent.com	SÖDERHAMN	VÄXJÖ
				LIDKÖPING	VARBERG
				ÖSTERSUND	LUND

1998-10-07 11:09 G:\PAT\MP\KORRESP\MYNDB\2981378.DOC

Copied from 90005744 on 05/18/2006



P.B. 5818 - Patentaan 2  
2280 HV Rijswijk (ZH)  
☎ (070) 3 40 20 40  
TX 3181 800 nl  
FAX (070) 3 40 30 18

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HBG

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200 71 Malmö  
SUEDE



Datum/Date  
30/09/98

Inv./Ref./Ref.	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.
2981378	98201555.4-2303 / 0877130
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Välinge Aluminium AB	

# NOTIFICATION OF EUROPEAN PUBLICATION NUMBER AND INFORMATION ON THE APPLICATION OF ARTICLE 67(3) EPC

The Receiving Section hereby informs you that the technical preparations for publication of the above-mentioned European patent application have been completed.

The provisional protection under Art. 67(1) and (2) EPC in the individual Contracting States becomes effective only when the conditions referred to in Art. 67(3) EPC have been fulfilled (for further information, see EPO brochure "National Law relating to the EPC").

This application will be published on 11.11.98 without the European search report. The publication will be mentioned in European Patent Bulletin number 1998/46

The publication number is: 0877130

The amended title of the invention in the three official languages of the European Patent Office is worded as follows:

Ein aus einer Vielzahl von mechanisch miteinander verbundenen  
Paneele zusammengesetzter Fussboden

A flooring system comprising a plurality of floor panels which are mechanically connected to each other

Plancher composé de panneaux de revêtement reliés mécaniquement les uns aux autres

In all future communications to the EPO, please quote the application number as indicated above, i.e. including the final four figures (which identify the Directorate responsible for the subsequent procedure).

Amendments to a European patent application or European patent must be filed in the language of the proceedings.

REMARK: An issue of the published European patent application will be forwarded to you directly from our printer.

RECEIVING SECTION



90005744-022701



P.B. 5818 - Patentaan 2  
2280 HV Rijswijk (ZH)  
☎ (070) 3 40 20 40  
TX 31851 epo nl  
FAX (070) 3 40 20 16

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1998 -10- 06

AWAPATENT, Malmö

Deburr/Date

28.09.98

eu/Pat./P.M.

2981378

Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°.

98201555.4-2303/

Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire

Välinge Aluminium AB

# COMMUNICATION

The European Patent Office herewith transmits

- ☒ the European search report
- ☐ the declaration under Rule 45 EPC
- ☐ the partial European search report under Rule 45 EPC
- ☐ the supplementary European search report concerning the international application under Article 157 (2) EPC relating to the above-mentioned European patent application. Copies of the documents cited in the search report are enclosed.

The following specification given by the applicant have been approved by the Search Division:

- ☒ Abstract ☐ Title ☒ Figure
- ☐ The abstract was modified by the Search Division and the definitive text is attached to this communication
- ☐ The following figure will be published with the abstract, since the Search Division considers that it better characterises the invention than the one indicated by the applicant.

Figure:

- ☒ Additional copy (copies) of the documents cited in the European search report.

## REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.



EPO Form 1507.1 02.93





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 98 20 1555.4  
Page 1

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.6)
A, P	WO 9313280 A1 (JUNKERS INDUSTRIER A/S), 8 July 1993 (08.07.93) * abstract, details 1,2,3,14 *	1-9	E04F 15/14 E04F 15/02 E04F 13/08
A	US 3538665 A (P. GOHNER), 10 November 1970 (10.11.70) * details 7,9 *	1-9	
A	DE 2616077 A1 (HEWENER, H.J.), 27 October 1977 (27.10.77) * figure 1 *	1-9	
A	FR 1293043 A (ETABLISSEMENTS PIRAUD PLASTIQUES), 2 April 1962 (02.04.62) * figure 2, details 8,9,10 *	1-9	TECHNICAL FIELDS SEARCHED (Int. Cl.6) E04F A47G
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
STOCKHOLM		28 August 1998	NYLUND ÖRJAN
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background G : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document			

EPN FORM 150 (04/98) (P/04/98)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO. EP 98 20 1555.4**

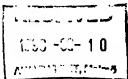
This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on 27/07/98.  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
WO	9313280	A1	08/07/93	CA 2125876 A	08/07/93
				EP 0624221 A	17/11/94
				JP 7502580 T	16/03/95
US	3538665	A	10/11/70	NONE	
DE	2616077	A1	27/10/77	NONE	
FR	1293043	A	02/04/62	NONE	

EP 98 20 1555.4

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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200 71 Malmö  
SUEDE



Datum/Date	07.08.98
------------	----------

7 <i>VarRef./Ref.</i>	Anmeldning Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.
2981378	98201555.4-2303/
Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire Välinge Aluminium AB	

**MITTEILUNG GEMÄSS TEIL A-III, 5.3 DER RICHTLINIEN FÜR DIE PRÜFUNG IM EPA**

Die dem nachstehend angegebenen Erfinder gemäss Regel 17(3) EPÜ über-  
sandte Mitteilung kam unzustellbar zurück. Bitte teilen Sie uns die  
richtige Adresse des Erfinders mit (Regel 17(1) EPÜ).

\*\*\*

NOTIFICATION PURSUANT TO PART A-III, 5.3 OF THE GUIDELINES FOR  
EXAMINATION IN THE EPO

The communication issued pursuant to Rule 17(3) EPC, sent to the inventor designated below, has been returned by the postal services. You are requested to indicate the correct address of the inventor (Rule 17(1)).

\*\*\*

NOTIFICATION FAITE EN APPLICATION DE LA PARTIE A-III, 5.3 DES DIRECTIVES  
RELATIVES A L'EXAMEN PRATIQUE A L'OEB

La communication selon la règle 17(3) CBE, transmise à l'inventeur désigné ci-après, a été retournée par les services postaux. Vous êtes prié d'indiquer l'adresse exacte de l'inventeur (règle 17(1) CBE).

ERFINDER : Pervan, Tony  
INVENTOR : Radjursstigen 32  
INVENTEUR : SE / 170 72 Solna

EINGANGSSTELLE  
RECEIVING SECTION  
SECTION DE DEPOT





# Antrag auf Erteilung eines europäischen Patents / Request for grant of a European patent / Requête en délivrance d'un brevet européen

Bestätigung einer bereits durch Telefax (Telefax eingereichte Anmeldung / Confirmation of an application already filed by facsimile / Confirmation d'une demande déjà déposée par télécopie  
Wenn a. Datum der Übermittlung der Telefaxe und Name der Erreichungsbehörde / If yes, facsimile date and name of the authority with which the documents were filed / Si oui, date d'envoi de la télécopie et nom de l'autorité de dépôt

☒ Ja / Yes / Oui

Datum / Date

980512

Behörde / Authority / Autorité

EPO

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration			
Anmeldenummer / Application No. / N° de la demande	MKEY	1	
Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2))	DREC	2	
Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt in EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA	3	
Anmeldetag / Date of filing / Date de dépôt		4	
Tabulatoren-Positionen / Tabulation marks / Arrêts de tabulation			
Es wird die Erteilung eines europäischen Patents und gemäß Artikel 94 die Prüfung der Anmeldung beantragt / Grant of a European patent, and examination of the application under Article 94, are hereby requested / Il est demandé la délivrance d'un brevet européen et, conformément à l'article 94, l'examen de la demande			
Zeichen des Anmelders oder Vertreters (max. 15 Positionen) / Applicant's or representative's reference (maximum 15 spaces) / Référence du demandeur ou du mandataire (max. 15 caractères ou espaces)		EXAM 4	5
ANWELDER / APPLICANT / DEMANDEUR Name / Nom		AREF	6
Anschrift / Address / Adresse			7
APPR 01 #			8
# DEST #			9
Zustellschrift / Address for correspondence / Adresse pour la correspondance			10
PADR			11
Staat des Wohnsitzes oder Sitzes / State of residence or of principal place of business / Etat du domicile ou du siège			12
Staatsangehörigkeit / Nationality / Nationalité			13
Telefon / Telephone / Téléphone			14
Telefax / Télex			15
Telefax / Fax / Télécopie			16
Weiterer(e) Anmelder auf Zusatzblatt / Additional applicant(s) on additional sheet / Autre(s) demandeur(s) sur feuille additionnelle			17
VERTRETER / REPRESENTATIVE / MANDATAIRE: Name / Nom			18
Nur einen Vertreter angeben, der in das europäische Patentregister eingetragen und an den zuerst schriftlich / Name only one representative, who is to be listed in the Register of European Patents and to whom notification is to be made / N'indiquer qu'un seul mandataire, qui sera inscrit au Registre européen des brevets et auquel notification sera faite			19
FREP 01			
Geschäftsanschrift / Address of place of business / Adresse professionnelle			
Telefon / Telephone / Téléphone			
Telefax / Télex			
Telefax / Fax / Télécopie			
Weiterer(e) Vertreter auf Zusatzblatt / Additional representative(s) on additional sheet / Autre(s) mandataire(s) sur feuille additionnelle			
TRAN		FILL	

Prüfungsantrag in einer zugelassenen Nichtamtssprache (siehe Merkblatt II, S.1) / Request for examination in an admissible non-EPO language (see Notes II, S.1) / Requête en examen dans une langue non officielle autorisée (voir notice II, S.1)  
Härmed begärs patenterbarhetsprövning enligt Art. 94 EPC

2981378

VÄLINGE ALUMINIUM AB

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S-260 40 VIKEN  
Sweden

Sweden

Sweden

GIVER, Sören

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Sweden

+46 40 98 51 00

32407 +46 40 26 05 16

2981378

Raum für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur

Vollmacht / Authorisation / Pouvoir: Ist beigelegt / Is enclosed / ci-joint	20 <input type="checkbox"/>															
Ist registriert unter Nummer / has been registered under No. / a été enregistré sous le n°	21 <input type="checkbox"/>															
ERFINDER / INVENTOR / INVENTEUR	22 <input type="checkbox"/>															
Anmelder ist (sind) allein(er) Erfinder / The applicant(s) is (are) the sole inventor(s) / Le(s) demandeur(s) est (sont) le (les) seul(s) inventeur(s) Erfindernennung auf gesondertem Schriftstück / Designation of inventor attached / Voir la désignation de l'inventeur ci-jointe	23 <input type="checkbox"/>															
BEZEICHNUNG DER ERFINDUNG / TITLE OF INVENTION / TITRE DE L'INVENTION: <div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-around;"> <span>TIDE</span> <span>TIEN</span> <span>TIFR</span> </div>	24 <b>FLOORING SYSTEM</b>															
PRIORITÄTSERKLÄRUNG / DECLARATION OF PRIORITY / DECLARATION DE PRIORITE 01 # . . . . . # . . . . . 02 # . . . . . # . . . . . 03 # . . . . . # . . . . . 04 # . . . . . # . . . . . Weitere Prioritätserklärungen auf Zusatzblatt / Additional declaration(s) of priority on additional sheet / Autres déclarations de priorité sur feuille additionnelle	25 <table border="1"> <tr> <th>Staat / State / Etat</th> <th>Anmeldetag / Filing date / Date de dépôt</th> <th>Anzeichen / Application No. / N° de la demande</th> </tr> <tr> <td>1 Sweden</td> <td>93-05-10</td> <td>9301595-6</td> </tr> <tr><td>2</td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td></tr> </table>	Staat / State / Etat	Anmeldetag / Filing date / Date de dépôt	Anzeichen / Application No. / N° de la demande	1 Sweden	93-05-10	9301595-6	2			3			4		
Staat / State / Etat	Anmeldetag / Filing date / Date de dépôt	Anzeichen / Application No. / N° de la demande														
1 Sweden	93-05-10	9301595-6														
2																
3																
4																
BIOLOGISCHES MATERIAL Die Erfindung betrifft biologisches Material oder seine Verwendung, das nach Regel 28 hinterlegt worden ist. BIOLOGICAL MATERIAL The invention relates to and/or uses biological material deposited under Rule 28. BIOM 1 # . . . . . # Die Angaben nach Regel 28(1) c) sind in den technischen Anmeldeunterlagen enthalten auf / The particulars referred to in Rule 28(1) (c) are given in the technical documents in the application on / Les indications visées à la règle 28(1) c) figurent dans les pièces techniques de la demande à la / aux werden später mitgeteilt / will be submitted later / seront communiquées ultérieurement Die Empfangsberechnungen der Hinterlegungsstelle ist (sind) beigelegt / The receipt(s) of deposit issued by the depositary institution is (are) enclosed / Le(s) récépissé(s) de dépôt déposé(s) par l'autorité de dépôt est (sont) ci-joint(s) wird (werden) nachgereicht / will be filed later / sera (seront) produit(s) ultérieurement	26 <b>MATIERE BIOLOGIQUE</b> L'invention concerne étou utilise la matière biologique, déposée conformément à la règle 28. 27 <table border="1"> <tr> <th>Seite(n) / page(s)</th> <th>Zeile(n) / line(s) / ligne(s)</th> </tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table>	Seite(n) / page(s)	Zeile(n) / line(s) / ligne(s)													
Seite(n) / page(s)	Zeile(n) / line(s) / ligne(s)															
Verzicht auf die Verpflichtung des Antragstellers nach Regel 28(3) auf gesondertem Schriftstück / Waiver of the right to an undertaking from the requester pursuant to Rule 28(3) attached / Renonciation, sur document distinct, à l'engagement du requérant au titre de la règle 28(3)	28a <input type="checkbox"/> 28 <input type="checkbox"/> 29 <input type="checkbox"/>															

Falls das biologische Material nicht vom Anmelder, sondern von einem Dritten hinterlegt wurde: / Where the biological material has been deposited by a person other than the applicant: / Lorsque la matière biologique a été déposée par une personne autre que le demandeur:

Ermächtigung nach Regel 28(1)(d) / Authorisation under Rule 28(1)(d) / Autorisation en vertu de la règle 28(1)(d)

Ist beigelegt: / Is enclosed / est jointe

wird nachgereicht / will be filed later / sera produit ultérieurement

**NUCLEOTID- UND AMINOSÄURESEQUENZEN / NUCLEOTIDE AND AMINO ACID SEQUENCES / SEQUENCES DE NUCLEOTIDES ET D'ACIDES AMINES**

SEQ. (1)

Die Beschreibung enthält ein Sequenzprotokoll nach Regel 27a(1) / The description contains a sequence listing in accordance with Rule 27a(1) / La description contient une liste de séquences selon la règle 27bis(1)

Der vorgeschriebene maschinenlesbare Datenträger ist beigelegt / The prescribed machine readable data carrier is enclosed / Le support de données prescrit décodifiable par machine est annexé

Es wird hiermit erklärt, daß die auf dem Datenträger gespeicherte Information mit dem schriftlichen Sequenzprotokoll übereinstimmt (Regel 27a(2)) / It is hereby stated that the information recorded on the data carrier is identical to the written sequence listing (Rule 27a(2)) / Il est déclaré par la présente que l'information figurant sur le support de données est identique à celle que contient la liste de séquences écrite (règle 27bis (2))

**BENENNUNG DER VERTRAGSSTAA TEN UND ERKLÄRUNGEN HIERZU**

**DESIGNATION OF THE CONTRACTING STATES AND ASSOCIATED DECLARATIONS**

1. Hiermit werden sämtliche Vertragsstaaten des EPÜ benannt, die bei Einreichung dieser Anmeldung dem EPÜ angeschlossen.  
2. Der Anmelder beabsichtigt derzeit, Benennungsgebühren für die nachfolgend angekreuzten Vertragsstaaten zu entrichten.

1. All States which are Contracting States to the EPC at the filing of this application are hereby designated.  
2. The applicant currently intends to pay designation fees for the States marked below with a cross:

DEST

- ☒ AT Österreich / Austria / Autriche  
☒ BE Belgien / Belgium / Belgique  
☒ CH/LI Schweiz und Liechtenstein / Switzerland and Liechtenstein / Suisse et Liechtenstein  
☒ DE Deutschland / Germany / Allemagne  
☒ DK Dänemark / Denmark / Danemark  
☒ ES Spanien / Spain / Espagne  
☐ FI Finnland / Finland / Finlande  
☒ FR Frankreich / France / France  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

(Place for Contracting States, for the use of the EPO, after the printing of this form has been completed) / (Space for Contracting States for which the EPC enters into force after this form has been printed) / (Espace pour des Etats contractants à l'égard desquels le CBE entre en vigueur après l'impression du présent formulaire)

Es wird beantragt, für die unter Nr. 2 nicht angekreuzten Vertragsstaaten von der Zustellung von Mitteilungen nach Regel 85a(1) und Regel 69(1) abzusehen.  
Ist ein automatischer Abbuchungsauftrag erteilt worden (Punkt 43), so wird beantragt, bei Ablauf der Grundfrist nach Artikel 79(2) Benennungsgebühren nur für die unter Nr. 2 angekreuzten Vertragsstaaten abzubuchen.

It is requested that no communications under Rule 85a(1) and Rule 69(1) be notified concerning the Contracting States not marked with a cross under No. 2.  
If an automatic debit order has been given (section 43), it is requested that, when the basic period specified in Art. 79(2) expires, designation fees be debited only for the Contracting States marked with a cross under No. 2.

Name und Anschrift des Hinterlegers / Name and address of depositor / Nom et adresse du déposant:

30 ☐  
30a ☐  
30b ☐

31 ☐  
☐  
☐  
☐

32 ☒

**DESIGNATION D'ETATS CONTRACTANTS ET DECLARATIONS A CE PROPOS**

1. Sont désignés tous les Etats qui sont des Etats contractants de la CBE à la date du dépôt de la présente demande.  
2. Le demandeur se propose actuellement de payer des taxes de désignation pour les Etats cochés ci-dessous:

- ☒ GB Vereinigtes Königreich / United Kingdom / Royaume-Uni  
☒ GR Griechenland / Greece / Grèce  
☒ IE Irland / Ireland / Irlande  
☒ IT Italien / Italy / Italie  
☒ LU Luxemburg / Luxembourg / Luxembourg  
☒ MC Monaco / Monaco / Monaco  
☒ NL Niederlande / Netherlands / Pays-Bas  
☒ PT Portugal / Portugal / Portugal  
☒ SE Schweden / Sweden / Suède  
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

(Place for Contracting States, for the use of the EPO, after the printing of this form has been completed) / (Space for Contracting States for which the EPC enters into force after this form has been printed) / (Espace pour des Etats contractants à l'égard desquels le CBE entre en vigueur après l'impression du présent formulaire)

☒ Prière de ne pas procéder à la signification des notifications prévues par les règles 85bis(1) et 69(1) pour les Etats contractants n'ayant pas été cochés au n° 2.  
Si un ordre de prélèvement automatique a été donné (paragraphe 43), prière de ne prélever à l'expiration des délais de base tels que définis à l'article 79(2) que les taxes de désignation pour les Etats contractants cochés au n° 2.

90005744-022-01

<p><b>Verschiedene Anmelder für verschiedene Vertragsstaaten /</b>  <b>Different applicants for different Contracting States /</b>  <b>Différents demandeurs pour différents Etats contractants</b></p> <p>APPR 02 # _____ # _____</p>	<p>33 Name(n) des (der) Anmelder(s) und benannte Vertragsstaaten /          Name(s) of applicant(s) and designated Contracting States /          Nom(s) du (des) demandeur(s) et des Etats contractants désignés</p>																																	
<p><b>ERSTRECKUNG DES EUROPÄISCHEN PATENTS</b></p> <p>Diese Anmeldung gilt als Antrag, die europäische Patentanmeldung und das darauf erteilte europäische Patent auf alle Nicht-Vertragsstaaten des EPÜ zu erstrecken, mit denen am Tag ihrer Einreichung „Erstreckungsabkommen“ bestehen (Daher: Albanien, Litauen, Lettland, Rumänien, Slowenien). Die Erstreckung wird jedoch nur wirksam, wenn die vorgeschriebene Erstreckungsgebühr entrichtet wird.</p> <p><b>EXTENSION OF THE EUROPEAN PATENT</b></p> <p>This application is deemed to be a request to extend the European patent application and the European patent granted in respect of it to all non-Contracting States to the EPC, with which "extension agreements" exist on the date on which the application is filed (Present situation: Albania, Lithuania, Latvia, Romania, Slovenia). However, the extension only takes effect if the prescribed extension fee is paid.</p> <p><b>EXPT</b></p> <p>Der Anmelder beabsichtigt derzeit, die Erstreckungsgebühr für die nachfolgend angekreuzten Staaten zu entrichten: / The applicant currently intends to pay the extension fee for the States marked below with a cross: / Le demandeur se propose actuellement d'acquitter la taxe d'extension pour les Etats dont le nom est coché ci-après:</p> <table border="0"> <tr> <td>Albanien / Albania / Albanie</td> <td>AL</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Litauen / Lithuania / Lituanie</td> <td>LT</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Lettland / Latvia / Lettonie</td> <td>LV</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Rumänien / Romania / Roumanie</td> <td>RO</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Slowenien / Slovenia / Slovénie</td> <td>SI</td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> </table> <p><small>(Platz für Staaten, mit denen nach Drucklegung dieses Formblatts „Erstreckungsabkommen“ in Kraft treten) /          Space for States with which "extension agreements" enter into force after the form has been printed /          Espace pour des Etats à l'égard desquels des «accords d'extension» entrent en vigueur après l'impression du présent formulaire.</small></p>	Albanien / Albania / Albanie	AL	<input type="checkbox"/>	Litauen / Lithuania / Lituanie	LT	<input type="checkbox"/>	Lettland / Latvia / Lettonie	LV	<input type="checkbox"/>	Rumänien / Romania / Roumanie	RO	<input type="checkbox"/>	Slowenien / Slovenia / Slovénie	SI	<input type="checkbox"/>	_____	_____	<input type="checkbox"/>	_____	_____	<input type="checkbox"/>	_____	_____	<input type="checkbox"/>	_____	_____	<input type="checkbox"/>	_____	_____	<input type="checkbox"/>	_____	_____	<input type="checkbox"/>	<p>34 <b>EXTENSION DES EFFETS DU BREVET EUROPEEN</b></p> <p>La présente demande est réputée constituer une requête en extension des effets de la demande de brevet européen et du brevet européen délivré sur la base de cette demande à tous les Etats non parties à la CBE avec lesquels il existe un «accord d'extension» à la date du dépôt de la demande (Situation actuelle : Albanie, Lituanie, Lettonie, Roumanie, Slovénie). Toutefois l'extension ne produit ses effets que s'il est acquitté la taxe d'extension prescrite.</p>
Albanien / Albania / Albanie	AL	<input type="checkbox"/>																																
Litauen / Lithuania / Lituanie	LT	<input type="checkbox"/>																																
Lettland / Latvia / Lettonie	LV	<input type="checkbox"/>																																
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<p><b>Die Anmeldung ist eine Teilanmeldung /</b>  <b>The application is a divisional application /</b>  <b>La présente demande constitue une demande divisionnaire</b></p> <p>DFIL 9 _____ # _____</p> <p>PANR _____ # _____</p> <p><b>Es handelt sich um eine Anmeldung nach Art. 61(1)(b) /</b>  <b>The application is an Art. 61(1)(b) application / La présente demande constitue une demande selon l'article 61(1)(b)</b></p> <p>DFIL 9 _____ # _____</p> <p>EANR _____ # _____</p> <p><b>Patentansprüche / Claims / Revendications</b></p> <p>CLMS _____</p> <p><b>Zur Veröffentlichung mit der Zusammenfassung wird vorgeschlagen</b>  <b>Abbildung Nr. / With the abstract it is proposed to publish</b>  <b>figure No. / Il est proposé de publier avec l'abré</b>  <b>la figure n°</b></p> <p>DRAW (2) _____</p>	<p>35 x <b>94915725.9</b> Nummer der früheren Anmeldung          No. of earlier application          Numéro de la demande initiale</p> <p>36 <b>_____</b> Nummer der früheren Anmeldung          No. of earlier application          Numéro de la demande initiale</p> <p>37 <b>9</b> Zahl der Patentansprüche          Number of claims          Nombre de revendications</p> <p>38 <b>3a-3c</b> Nummer / Number / Numéro</p>																																	



Zusätzliche Abschrift(en) der im europäischen Recherchenbericht angeführten Schriftstücke wird (werden) beantragt / Additional copy(ies) of the documents cited in the European search report is (are) requested / Prière de fournir une (des) copie(s) supplémentaire(s) des documents cités dans le rapport de recherche européenne

ASOC

40

1

Anzahl der zusätzlichen Sätze von Abschriften  
Number of additional sets of copies  
Nombre de jeux supplémentaires de copies

Es wird die Rückerstattung der Recherchengebühr gemäß Art. 10 GebD beantragt / Refund of the search fee is requested pursuant to Article 10 of the Rules relating to Fees / Le remboursement de la taxe de recherche est demandé en vertu de l'article 10 du règlement relatif aux taxes

Eine Kopie des Recherchenberichts ist beigelegt / A copy of the search report is attached / Une copie du rapport de recherche est jointe

41

42

AUTOMATISCHER ABBUCHUNGS-AUFTRAG (nur möglich für Inhaber von beim EPA geführten laufenden Konten)  
AUTOMATIC DEBIT ORDER (for EPO deposit account holders only)  
ORDRE DE PRELEVEMENT AUTOMATIQUE (uniquement possible pour les titulaires de comptes courants ouverts auprès de l'OEB)

Das Europäische Patentamt wird hiermit beauftragt, fällig werdende Gebühren und Ausgaben nach Maßgabe der Vorschriften über das automatische Abbuchungsverfahren vom nebenstehenden laufenden Konto abzubuchen / The European Patent Office is hereby authorised, under the Arrangements for the automatic debiting procedure, to debit from the deposit account opposite any fees and costs falling due / Par la présente, il est demandé à l'Office européen des brevets de prélever du compte courant ci-contre les taxes et frais venant à échéance, conformément à la réglementation relative au prélèvement automatique

DECA

43

FÜR AUTOMATISCHEN ABBUCHUNGS-AUFTRAG:  
FOR AUTOMATIC DEBIT ORDER:  
POUR L'ORDRE DE PRELEVEMENT AUTOMATIQUE:

Nummer des laufenden Kontos /  
Deposit account number /  
Numéro du compte courant

Name des Kontoinhabers /  
Account holder's name /  
Nom du titulaire du compte

Eventuelle RÜCKZAHLUNGEN auf das nebenstehende beim EPA geführte laufende Konto / REIMBURSEMENT. If any, to EPO deposit account opposite / REMBOURSEMENTS éventuels à effectuer sur le compte courant ci-contre ouvert auprès de l'OEB

DEPA

44

Nummer des laufenden Kontos /  
Deposit account number /  
Numéro du compte courant

Name des Kontoinhabers /  
Account holder's name /  
Nom du titulaire du compte

2810.0022

AWAPATENT AB

Die vorgeschriebene Liste über die diesem Antrag beigelegten Unterlagen ergibt sich aus der vorbereiteten Empfangsbescheinigung (Seite 6 dieses Antrags)

The prescribed list of documents enclosed with this request is shown on the prepared receipt (page 6 of this request)

45

La liste prescrite des documents joints à cette requête figure sur le récépissé préétabli (page 6 de la présente requête)

Unterschrift(en) des (der) Anmelders(s) oder Vertreters(s) /  
Signature(s) of applicant(s) or representative(s) /  
Signature(s) du (des) demandeur(s) ou du (des) mandataire(s)

46

Für Angestellte nach Artikel 133(3) Satz 1 mit allgemeiner Vollmacht / For employees under Article 133(3), 1st sentence, having a general authorisation / Pour les employés mentionnés à l'article 133(3), 1<sup>ère</sup> phrase, munis d'un pouvoir général  
Nr. / No. / n°:

Ort / Place / Lieu MALMÖ

Datum / Date 1998-05-12

Sören Giver  
Authorised Representative

Name des (der) Unterzeichners bitte mit Schreibmaschine wiederholen. Bei juristischen Personen bitte die Stellung des (der) Unterzeichners innerhalb der Gesellschaft mit Schreibmaschine angeben. / Please type name(s) and position of the signatory within the company should also be typed. / Le ou les noms des signataires doivent être également dactylographiés. S'il s'agit d'une personne morale, la position occupée par le ou les signataires sera indiquée à la machine à écrire.

# Empfangsbescheinigung / Receipt for documents / Récépissé de documents 6

(Liste des documents déposés en annexe)

(Checklist of enclosed documents)

(Liste des documents annexés à la présente requête)

Es wird hiermit der Empfang der unten bezeichneten Dokumente bescheinigt / Receipt of the documents indicated below is hereby acknowledged / Nous attestons le dépôt des documents désignés ci-dessous

Wird im Falle der Einreichung der europäischen Patentanmeldung bei einer nationalen Behörde diese Empfangsbescheinigung vom Europäischen Patentamt übersandt, so ist sie als Mitteilung gemäß Regel 24(4) anzusehen (siehe Feld RENA). Nach Erhalt der Mitteilung nach Regel 24(4) sind alle weiteren Unterlagen, die die Anmeldung betreffen, nur noch unmittelbar beim EPA einzureichen. / If this receipt is issued by the European Patent Office and the European patent application was filed with a national authority it serves as a communication under Rule 24(4) (see Section RENA). Once the communication under Rule 24(4) has been received, all further documents relating to the application must be sent directly to the European Patent Office. / Si, en cas de dépôt de la demande de brevet européen auprès d'un service national, l'Office européen des brevets délivre le présent récépissé de documents, ce récépissé est réputé être la notification visée à la règle 24(4). Dès que la notification visée à la règle 24(4) a été reçue, tous les autres documents relatifs à la demande doivent être adressés directement à l'OEB.

AWAPATENT AB  
Box 5117  
S-200 71 MALMÖ  
Sweden

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Datum / Date

Unterschrift / Amtsstempel / Signature / Official stamp / Signature / Cachet officiel

Anmeldenummer / Application No / N° de la demande

Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))

DREC

Zeichen des Anmelders/Verträgers / Applicant's/ Representative's ref. / Référence du demandeur ou du mandataire

AREF

Nur nach Einreichung der Anmeldung bei einer nationalen Behörde: / Only after filing of the application with a national authority: / Seulement après le dépôt de la demande auprès d'un service national:

Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))

RENA

A. Anmeldeunterlagen und Prioritätsbelege (A) / Application documents and priority documents / Pièces de la demande et documents de priorité

47

Stückzahl /  
Number of copies /  
Nombre d'exemplaires

Blattzahl\* eines Stücks /  
Number of sheets\* in  
each copy /  
Nombre de feuilles\* par  
exemplaire

Gesamtzahl  
der Abbildungen\* /  
Total number of figures\* /  
Nombre total de figures\*

1. Beschreibung / Description

3

19

2. Patentansprüche / Claims / Revendications

3

4

3. Zeichnungen / Drawings / Dessins

DRAW 1 #

3

6

4. Zusammenfassung / Abstract / Abrégé

3

13

5. Übersetzung der Anmeldeunterlagen / Translation of the application documents / Traduction des pièces de la demande

3

1

6. Prioritätsbelege (Priority documents) / Documents de priorité

7. Übersetzung des (der) Prioritätsbelegs (Translation of priority documents) / Traduction du (des) document(s) de priorité

B. Die Anmeldung in der eingereichten Fassung liegt folgende Unterlagen bei: / This application as filed is accompanied by the items below: / A la présente demande sont annexées les pièces suivantes:

48

1. Einzelvollmacht / Specific authorisation / Pouvoir particulier

☒ Copy of authorisation filed in the parent application.

2. Allgemeine Vollmacht / General authorisation / Pouvoir général

3. Erfindernennung / Designation of inventor / Désignation de l'inventeur

☒

4. Früherer Recherchenbericht / Earlier search report / Rapport de recherche antérieure

5. Gebührenzahlungsvordruck (EPA Form 1010) / Voucher for the settlement of fees (EPO Form 1010) / Bordereau de règlement de taxes (OEB Form 1010)

6. Scheck (ausgegeben bei Einreichung bei den nationalen Behörden) / Cheque (not when filing with national authorities) / Chèque (pas de chèque en cas de dépôt auprès des services nationaux)

7. Datensequenz (für Sequenzprotokoll) / Data carrier for sequences listing / Support de données pour liste de séquences

SEQ (4)

8. Zusatzblatt / Additional sheet / Feuille additionnelle

9. Sonstige Unterlagen Bitte hier spezifizieren / Other (please specify here) / Autres documents (veuillez préciser ici)

10. Kopien dieser Empfangsbescheinigung / Copies of this receipt for documents / Copies du présent récépissé de documents

☒ Debit Order

49

2 Anzahl der Kopien / Number of copies / Nombre de copies

\* Die Richtigkeit der Angabe der Blattzahl und der Gesamtzahl der Abbildungen wurde bei Eingang nicht geprüft / No check was made on receipt that the number of sheets and the total number of figures indicated were correct / L'exactitude du nombre de feuilles et du nombre total de figures n'a pas été contrôlée lors du dépôt

EPA/EPO/OEB Form 1001-B 07-97

2981378

Raum für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur

6

FLOORING SYSTEMTechnical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

- 5 More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one panel.

- The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

25 Background of the Invention

- A joint of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and grooves. The locking device for the second mechanical  
30 connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint

and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful for joining thick floor panels to form surfaces of a considerable expanse.

Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels employed are laid as "floating floors" without being attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in the groove and forcing the floor panels together. The tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board, and a base layer to balance the construction. The core has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall thickness must be at least about 7 mm. These known laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

Second, the core must be made of moisture-absorbent material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the floors thinner using so-called compact laminate, because

of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

Third, since the laminate layer of the laminated floors is highly wear-resistant, tool wear is a major  
 5 problem when working the surface in connection with the formation of the tongue.

Fourth, the strength of the joint, based on a glued tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the  
 10 depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in air humidity.

Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to  
 every panel on both the long and short sides thereof.

Sixth, it is not possible to disassemble a glued floor once laid, without having to break up the joints.  
 20 Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out panels be replaced without extensive efforts, which would  
 25 be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

Seventh, known laminated floors are not suited for such use as involves a considerable risk of moisture  
 30 penetrating down into the moisture-sensitive core.

Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam or the like, which is to damp impact sounds and to make  
 35 the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

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must be placed in edge-to-edge fashion. Different under-  
lays affect the properties of the floor.

There is thus a strongly-felt need to overcome the  
above-mentioned drawbacks of the prior art. It is however  
5 not possible simply to use the known joining technique  
with glued tongues and grooves for very thin floors, e.g.  
with floor thicknesses of about 3 mm, since a joint based  
on a tongue-and-groove connection would not be suffi-  
ciently strong and practically impossible to produce for  
10 such thin floors. Nor are any other known joining tech-  
niques usable for such thin floors. Another reason why  
the making of thin floors from e.g. compact laminate in-  
volves problems is the thickness tolerances of the pa-  
nels, being about 0.2-0.3 mm for a panel thickness of  
15 about 3 mm. A 3-mm compact laminate panel having such a  
thickness tolerance would have, if ground to uniform  
thickness on its rear side, an unsymmetrical design, en-  
tailing the risk of bulging. Moreover, if the panels have  
different thicknesses, this also means that the joint  
20 will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned  
problems by using double-adhesive tape or the like on  
the undersides of the panels, since such a connection  
catches directly and does not allow for subsequent  
25 adjustment of the panels as is the case with ordinary  
gluing.

Using U-shaped clips of the type disclosed in the  
above-mentioned SE 450,141, or similar techniques, to  
overcome the drawbacks discussed above is no viable al-  
30 ternative either. Especially, biased clips of this type  
cannot be used for joining panels of such a small thick-  
ness as 3 mm. Normally, it is not possible to disassemble  
the floor panels without having access to their un-  
dersides. This known technology relying on clips suffers  
35 from the additional drawbacks:

- Subsequent adjustment of the panels in their longi-  
tudinal direction is a complicated operation in con-

- nection with laying, since the clips urge the panels tightly against each other.
- Floor laying using clips is time-consuming.
  - This technique is usable only in those cases where the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
  - The floor panels can be joined together only at their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

- A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

- A particular object of the invention is to provide a panel-joining system which
- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
  - can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
  - makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
  - allows joining all the edges of the panels;
  - reduces tool wear when manufacturing floor panels with hard surface layers;

- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- 5 - makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

- 15 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

that the locking device further comprises a strip integrated with the other of said panels, termed strip panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with its locking element received in the locking groove of the groove panel,



that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

that the second mechanical connection is so conceived as to allow the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip.

The term "rear side" as used above should be considered to comprise any side of the panel located behind/ underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion of the joint edge.

It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can counteract or prevent such displacement and/or upward angling.

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The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-

5 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-

assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking

10 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a system is provided which permits precise joining of thin floor panels having, for example, a thickness of the order of 3 mm and which at the same time

15 provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip panel and which exhibits an exact, predetermined distance from its bottom to the front side of the strip panel. The

20 part of the strip projecting behind the groove panel engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance from its bottom to the front side of the groove panel.

25 The thickness of the strip then is at least so great that the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This

30 levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material

35 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an alu-

minium strip, sufficient strength can be achieved with a strip thickness of the order of 0.5 mm.

In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of the invention is characterised in that when the groove panel is pressed against the strip panel in the second direction and is turned angularly away from the strip, the maximum distance between the axis of rotation of the groove panel and the locking surface of the locking groove closest to the joint edges is such that the locking element can leave the locking groove without contacting the locking surface of the locking groove. Such a disassembly can be achieved even if the aforementioned play between the locking groove and the locking surface is not greater than 0.2 mm.

According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

For optimal function of the invention, the strip and the locking element should be formed on the strip panel with high precision. Especially, the locking surface of the locking element should be located at an exact distance from the joint edge of the strip panel.

Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

By known manufacturing methods, it is possible to produce a strip with a locking pin, for example by extruding aluminium or plastics into a suitable section, which is thereafter glued to the floor panel or is inserted in special grooves. These and all other tradi-

tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the

5 strip panel.

The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal

10 plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying

20 technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently

25 joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

The above and other features and advantages of the

35 invention will appear from the appended claims and the following description of embodiments of the invention.

The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

#### Description of Drawing Figures

5 Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

15 Figs 4a and 4b show a floor panel according to Figs 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

20 Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

#### Description of Preferred Embodiments

25 Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1 having

a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has

a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action.

As appears from Figs 4a and 4b, each panel in the system has a strip 6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

nection can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be  
 5 locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

The strip 6 is mounted in a tolerance-equalising groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will  
 15 always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel 2 has a corresponding tolerance-equalising surface or  
 20 groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the strip 6 is so chosen that the underside 44 of the strip  
 25 is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently transmitted to the subfloor 12 without any stresses being  
 30 exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels.  
 35 Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.



Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24.

The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail from below in the perspective view of Fig. 6.

Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.

The embodiment of Figs 2a-c is further characterised in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2 towards the subfloor 12 (Fig. 2b), as well as a portion 36

which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint edges 3, 4 have been brought into complete engagement

with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip panel 1, the projecting part of the strip 6 thus forming

an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of pan-

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els in all four directions with respect to the initial position.

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## CLAIMS

1. A flooring system, comprising a plurality of rectangular floor panels (1, 2), which are mechanically connectable to each other in parallel rows along adjacent long edges (3, 4) and short edges (3', 4'), respectively, of the panels, said floor panels being provided with means for mechanically locking together their long edges (3, 4) as well as their short edges (3', 4') in a first direction (D1) at right angles to the principal plane of the panels, thereby forming first mechanical connections between the panels (1, 2),

characterised in

that each panel, at a rear side thereof, being provided:

(i) with a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being integrally formed in one piece with the panel (1, 2) and forming an extension of a lower part of the corresponding edge of the panel (1, 2) and extending throughout substantially the entire length of the corresponding edge of the panel and being provided with a projecting locking element (8), and

(ii) with a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4'), each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel (1, 2), said locking strips (6, 6') and locking grooves (14, 14') forming second mechanical connections locking the panels to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4; 3', 4'), such that a strip (6, 6') of a first one (1) of two joined panels projects on the rear side of the second

panel with its locking element (8) received in the locking groove (14, 14') of the second panel (2),

that the first mechanical connection allows mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the panels, when joined together along their long edges (3, 4), can occupy a relative position in said second direction (D2) where a play ( $\Delta$ ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is facing the long edges (3, 4), such that also the second mechanical connection allow mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the second mechanical connection along the long edges (3, 4) is so conceived as to allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the locking groove (14) is turned about its long edge (4) angularly away from the strip (6), and

that each locking strip (6') at the short edges (3', 4') is flexible and resilient such that two panels (1, 2), having already been mechanically joined to a common long edge of a third panel, can be mechanically joined together at their adjacent short edges (3', 4') by displacing said two panels horizontally towards each other, while resiliently urging the flexible strip (6') at one (3') of said short edges downwards, until said adjacent short edges (3', 4') of the two panels (1, 2) have been brought into complete engagement with each other horizontally and the locking element (8) at said one short edge (3') thereby snaps into the locking groove (14') at the second short edge (4').

2. A flooring system as claimed in claim 1, characterised in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the

locking element (8) to enter the locking groove (14) if  
the panel (2) associated with the groove (14) is turned  
about its joint edge (4) angularly towards the strip (6)  
while holding the upper part of the joint edge (4) of the  
5 panel (2) associated with the groove in contact with the  
upper part of the joint edge (3) of the adjacent panel  
(1) associated with the strip.

3. A flooring system as claimed in claim 1 or 2,  
10 characterised in that the first mechanical  
connection as well as the second mechanical connection  
along the long edges (3, 4) are such that they allow the  
locking element (8) to leave the locking groove (14) if  
the panel (2) associated with the groove is turned about  
15 its joint edge (4) angularly away from the strip (6)  
while holding the upper part of the joint edge (4) of the  
panel (2) associated with the groove in contact with the  
upper part of the joint edge (3) of the adjacent panel  
(1) associated with the strip.

4. A flooring system as claimed in any one of the  
preceding claims, characterised in that, in  
order to resiliently urging the flexible strip (6')  
downwards while displacing said adjacent short edges (3',  
25 4') horizontally towards each other, said adjacent short  
edges (3', 4') being provided with cooperating lower and  
upper bevels (70, 72), such that the panels (1, 2) are  
forced to move vertically towards each other when their  
adjacent short edges (3', 4') are moved up to each other  
30 and the panels (1, 2) are pressed together horizontally.

5. A flooring system as claimed in any one of the  
preceding claims, characterised in that the  
locking surface (10) of the locking element (8) is  
35 extended from the front side (22) of the strip (6, 6')  
through a height in said first direction that is less  
than or equal to 2 mm.



6. A flooring system as claimed in any one of the preceding claims, characterized in that the locking element (8) consists of a locking edge extended  
5 continuously along the strip (6, 6').

7. A flooring system as claimed in any one of the preceding claims, characterized in that an underlay (46) of floor boards, foam, felt or the like is  
10 fixed to the rear sides (18, 16) of the panels (1, 2).

8. A flooring system as claimed in claim 7, characterized in that the underlay (46) is fixed so as to cover the strip (6, 6') in said second  
15 direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels (1, 2) is offset in said second direction relative to the joint edges (3, 4; 3', 4').

9. A system as claimed in any one of the preceding claims, characterized in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip (6, 6') between the locking element (8) and the joint edge  
25 (3, 3') of the panel (1) associated with the strip to seal against the other panel (2).

90005744-022701

## ABSTRACT

90005744-022704  
FOI 2020-445006

The invention relates to a system for laying and mechanically joining building panels, especially thin, hard, floating floors. Adjacent joint edges (3, 4) of two panels (1, 2) engage each other to provide a first mechanical connection locking the joint edges (3, 4) in a first direction (D1) perpendicular to the principal plane of the panels. In each joint, there is further provided a strip (6) which is integrated with one joint edge (3) and which projects behind the other joint edge (4). The strip (6) has an upwardly protruding locking element (8) engaging in a locking groove (14) in the rear side (16) of the other joint edge (4) to form a second mechanical connection locking the panels (1, 2) in a second direction (D2) parallel to the principal plane of the panels and at right angles to the joint. Both the first and the second mechanical connection allow mutual displacement of joined panels (1, 2) in the direction of the joint.

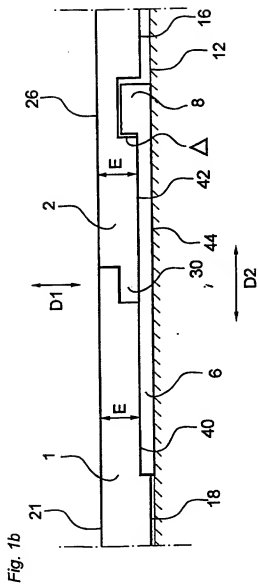
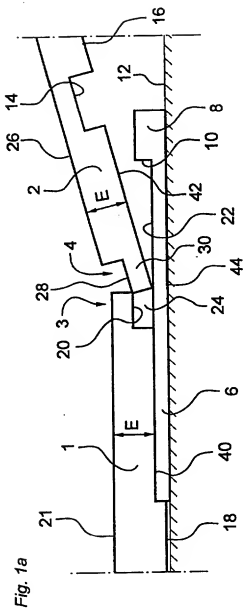




Fig. 3a

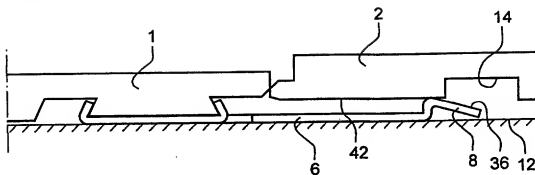


Fig. 3b

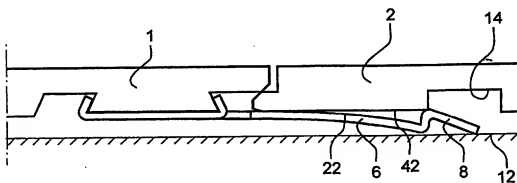


Fig. 3c

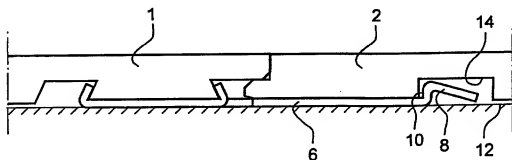


Fig. 4a

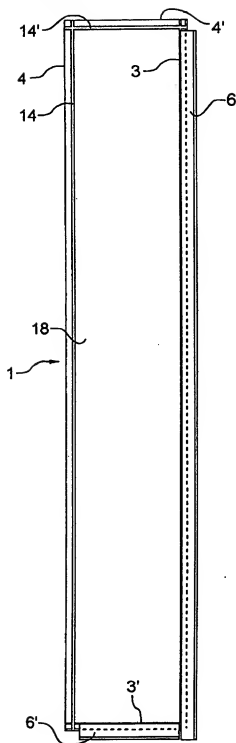
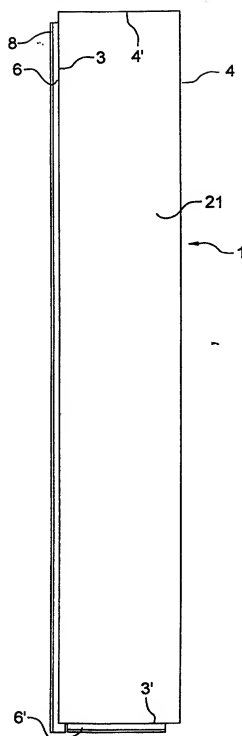


Fig. 4b









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Please read the notes before completing the form  
Veuillez lire les remarques avant de remplir le formulaire

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N° de la demande (du brevet)

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Representative's Reference (max. 15 spaces)  
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Vångavägen 48  
S-260 40 VIKEN  
Sweden

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all with address ÅWAPATENT AB, Box 5117, S-200 71 Malmö, SWEDEN  
ALM, Agneta; BURMAN, Tore; ELUNER, Lars; HENNINGSSON, Gunnar; HOLMGREN, Hans; LARSSON, Kjell;  
ÖRN, Christer; STURMER, Gert; all with address ÅWAPATENT AB, Box 45086, S-104 30 STOCKHOLM, SWEDEN  
FERKINGHOFF, Claes-Göran; FRANZEN, Lars; LINDBERG, Bo; RUDENIUS, Arne;  
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## SYSTEM FOR JOINING BUILDING PANELS

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Ort/Place/Lieu

Viken

Datum/Date

95-02-09

Unterschrift(en) / Signature(s)<sup>4</sup>

VÄLINGE ALUMINIUM AB

*Danko Peruvák* / **DANKO PERUVÁK**, Managing Director.

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# DESIGNATION OF INVENTOR

(where the applicant is not the inventor or is  
not the sole inventor)

Application No.

Applicant's or Representative's Reference:

2981378

In respect of the European patent application (title of the invention)

FLOORING SYSTEM

I(we), the undersigned \*)

Sören Giver

do hereby designate as inventor(s):

PERVAN, Tony  
Rådjursstigen 32  
S-170 72 SOLNA  
Sweden

☐ (Additional inventors indicated on supplementary sheet)

Statement indicating the origin of the right to the European patent.

By agreement

Place MALMÖ

Date 1998-05-12

Signature(s) of Applicant(s) or Representative(s)



Sören Giver  
Authorised Representative

\*) - Please supplement signature(s) by typewritten name(s) -

90005744-022701

# AWAPATENT AB

Malmö  
1998-05-12

Our ref.  
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European Patent Application No. 94915725.9  
Applicant(s): **VÄLINGE ALUMINIUM AB**

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Filing fee	<input checked="" type="checkbox"/> 100% <input type="checkbox"/> 80%	250
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Fee for add. copy of ref.	x	40
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National fee	<input type="checkbox"/> 80% <input type="checkbox"/> 0%	
Search fee		
Fee for add. claims	x	
Fee for add. copy of ref.	x	
Designation fee	16 x 150	2400
Extension fee	x	
Examination fee	<input type="checkbox"/> 100% <input checked="" type="checkbox"/> 80%	2240
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Sören Giver

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AWAPATENT, Malmö

Date/Date

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Inventor/Ref./Réf.

2980609

Anmeldung Nr./Application No./Demande n°/Patent No./Brevet n°.

98106535.2-2303/0855482

Applicant/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire

Välinge Aluminium AB

TRANSMISSION OF THE CERTIFICATE FOR A EUROPEAN PATENT  
PURSUANT TO RULE 54 (1) EPC

The certificate for a European patent, with the  
specification annexed thereto, is enclosed herewith.

G. TERNIEDEN  
Formalities Officer  
Tel.No.: (+49-89) 2399-4440





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# Urkunde Certificate Certificat

Es wird hiermit bescheinigt, daß für die in der beigefügten Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

It is hereby certified that a European patent has been granted in respect of the invention described in the annexed patent specification for the Contracting States designated in the specification.

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet ci-joint, pour les Etats contractants désignés dans le fascicule de brevet.

Europäisches Patent Nr.

European Patent No.

Brevet européen n°

0855482

Patentinhaber

Proprietor of the Patent

Titulaire du brevet

Välinge Aluminium AB  
Kyrkogränd 1  
260 40 Viken/SE

München, den  
Munich,  
Fait à Munich, le

01.12.99

Ingo Kober

Präsident des Europäischen Patentamts  
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Datum/Date

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Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°.

98106535.2-2303 0855482

Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire

Välinge Aluminium AB

# DECISION TO GRANT A EUROPEAN PATENT PURSUANT TO ARTICLE 97(2) EPC

Following examination of European patent application No. 98106535.2 a European patent with the title and the supporting documents indicated in the communication pursuant to Rule 51(4) EPC dated 11.08.99 is hereby granted in respect of the designated Contracting States. Any modifications which were subsequently requested have been approved by the Examining Division. Any corrections requested by the applicant a f t e r receipt of the communication under Rule 51(6) and received at the EPO on 00.00.00 have been taken into account.

Patent No. : 0855482  
Date of filing : 29.04.94  
Priority claimed : 10.05.93/SE 9301595  
Designated Contracting States and Proprietor(s) : AT-BE-CH-DE-DK-ES-FR-GB-GR-IE-IT-LI-LU-MC-NL-PT-SE  
Välinge Aluminium AB  
Kyrkogård 1  
260 40 Viken/SE

This decision will take effect on the date on which the European Patent Bulletin mentions the grant (Art. 97(4) and (5) EPC).

The mention of the grant will be published in European Patent Bulletin 99/48 of 01.12.99.

Examining Division  
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Registered letter

EPO Form 2006 01.95

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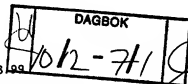
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Datum/Date  
 07.10.99

in/Ref./Réf.	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.
2980609	98106535.2-2303/
nnmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire Välinge Aluminium AB	

COMMUNICATION UNDER RULE 51(6) EPC



Further to the communication under Rule 51(4) dated 11.08.99

your approval of the text to be used as the basis for grant has been duly received.

Insofar as you have not already fulfilled the requirements mentioned below, you are now requested within a non-extendable period of three months from notification of this communication

1. to file in duplicate translations of the claim(s) in the two other EPO official languages (already received on 18-9-99)
 

	EUR	SEK
--	-----	-----
- 2a. to pay the fee for grant including the fee for printing up to and including 35 pages;
 

Reference 007 .....	715.00	6440.00
---------------------	--------	---------
- 2b. to pay the printing fee for the 36th and each additional page; Number of pages: 0
 

Reference 008 .....	0.00	0.00
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3. to pay the additional claims fee(s) (Rule 51(7) EPC);
 

Number of claims fees payable: 0		
Reference 016 .....	0.00	0.00
<hr style="border-top: 1px dashed black;"/>		
Total amount .....	715.00	6440.00

REGISTERED LETTER



If the equivalents are given in other currencies, then these come under the provision of possible changes in accordance with Art. 6(4) of the Rules Relating to Fees. Such changes will be published in the Official Journal.

For all payments you are requested to use EPO Form 1010 or to refer to the relevant reference number.

If additional copies of the patent specification are required, you should request this in writing and quote Fee reference code 0 5 8 when making payment.

If the grant, printing or claims fees are not paid or the translations not filed in due time, the European patent application will be deemed to be withdrawn (Rule 51(8) EPC).

Note on payment of renewal fees

If a renewal fee falls due between notification of the present communication and the proposed date of publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee has been paid (Rule 51(9) EPC).

Under article 86(4) EPC, renewal fees are payable to the European Patent Office until the year in which the mention of the grant of the European patent is published.

Filing of translations in the Contracting States

Pursuant to Article 65(1) EPC the following designated Contracting States require a translation of the specification of the European patent in their/one of their official language(s) (Rule 51(10) EPC), in s o f a r this specification will not be published in their/one of their official language(s)

- within t h r e e months of publication of the mention of such decision:

AT AUSTRIA  
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Anmeldung Nr./Application No./Demande n°//Patent Nr./Patent No./Brevet n°:

98106535.2

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98005744.022701





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PT PORTUGAL  
SE SWEDEN

- within s i x months of publication of the mention of such decision:

IE IRELAND

The date on which the European Patent Bulletin publishes the mention of the grant of the European patent will be indicated in the decision on the grant of the European patent (EPO Form 2006).

In case of a valid extension the following Extension States require a translation of the CLAIMS in their official language within t h r e e months after publication of the mention of the grant of the European patent:

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LT LITHUANIA  
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RO ROMANIA (requires translation of the specification)  
SI SLOVENIA

The translation must be filed with the national Patent Offices of the Contracting or Extension States in accordance with the provisions applying thereto in the State concerned. Further details (e. g. appointment of a national representative or indication of an address for service within the country) are given in the EPO information brochure "National law relating to the EPC", edition January 1997, and in the supplementary information published in the Official Journal of the EPO.

Failure to supply such translation to the Contracting and Extension States in time and in accordance with the requirements may result in the patent being deemed to be void ab initio in the State concerned.

Note to users of the automatic debiting procedure:

Unless the EPO receives prior instructions to the contrary, the fee(s) will be debited on the last day of the period for payment. For further details see the Arrangements for the automatic debiting procedure, Supplement to OJ EPO 06/1994.

For the Examining Division:

IDE F G C

Tel. No.: (+49-89) 2399-2449

2875

[ ] The text notified under Rule 51(4) EPC has been amended by the Ex-

Anmeldung Nr./Application No./Demande n°//Patent No./Brevet n°	Blatt/Page/Fauille
98106535.2	3



aming Division as requested by the applicant.  
Copies of the amended pages are annexed.

- [ ] The text notified under Rule 51(4) EPC has been amended using the replacement pages filed by the applicant.
- [ ] Form 2530 relating to filing a translation of the previous application is dispatched by the same post.

90005744.02.701

Anmeldung Nr / Application No / Demande n° / Patent Nr / Patent No / Brevet n°	Blatt/Page/Feuille
98106535.2	4

EPO Form 2005 01.98 Registered letter 7005004 04/10/99



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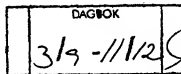
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Awap patent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE



Application No. 98 106 535.2-2303	Ref. 2980609	Date 11.08.99
Applicant Vålinge Aluminium AB		

#### Communication under Rule 51(4) EPC

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

#### Description, pages:

1-19 as originally filed

#### Claims, No.:

1-8 as received on 24.06.1999 with letter of 17.06.1999

#### Drawings, sheets:

1-6 as originally filed

With the following amendments to the above-mentioned documents by the Examining Division:

Description, pages: 1\*,5\*,6\*,8\*

Claim, No.: 3

#### Comments:

- \* Article 84 EPC: The claims shall define the matter for which protection is sought. They shall be clear and concise and be **supported by the description**



Date

11.08.99

Sheet 2

Application-No.: 98 106 535.2

A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2056.

You are requested to state your approval of the text specified above **within four months** of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 1995, 841.

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 167(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4.

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Himmel, U  
For the Examining Division  
Tel. No.: (+49-89) 2399-2449

Enclosure(s): Form 2056  
29 Copies of the relevant documents



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P.O. Box 5117  
200 71 Malmö  
SUEDE

Application No. 98 106 535.2-2303	Ref. 2980609	Date 1 1. 08. 99
Applicant Vålinge Aluminium AB		

For the intended grant of a European patent, (1) the title of the invention in the three official languages of the European Patent Office, (2) the International Patent Classification, (3) the designated Contracting States and (4) the applicant's registered name, address and country of residence or principal place of business are set out below.

- (1) - Methode zum Verlegen und mechanischen Verbinden von Bauplatten  
- A method for laying and mechanically joining building panels  
- Méthode pour la pose et la jonction d'éléments de construction
- (2) E04F15/14, E04F15/02, E04F13/08
- (3) AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE
- (4) Vålinge Aluminium AB  
Kyrkogränd 1  
260 40 Viken  
SE

A METHOD FOR LAYING AND MECHANICALLY JOINING BUILDING  
PANELS AND A METHOD FOR PRODUCING A FLOOR

Technical Field

The invention generally relates to a <sup>method of laying</sup> ~~system for pro-~~  
~~viding a joint along adjacent joint edges of~~ two building  
panels, especially floor panels.

- 5 ~~More specifically,~~ The joint <sup>between the panels to be laid</sup> ~~is~~ of the type where  
the adjacent joint edges together form a first mechanical  
connection locking the joint edges to each other in  
a first direction at right angles to the principal plane  
of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in  
a second direction parallel to the principal plane and at  
right angles to the joint edges, the locking device com-  
prising a locking groove which extends parallel to and  
spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one  
panel.

- The invention is especially well suited for use in  
joining floor panels, especially thin laminated floors.  
Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused  
on this field of use. It should however be emphasised  
that the invention is useful also for joining ordinary  
wooden floors as well as other types of building panels,  
such as wall panels and roof slabs.

25 Background of the Invention

- A joint of the aforementioned type is known e.g.  
from SE 450,141. The first mechanical connection is  
achieved by means of joint edges having tongues and  
grooves. The locking device for the second mechanical  
30 connection comprises two oblique locking grooves, one in  
the rear side of each panel, and a plurality of spaced-

nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

- A main object of the invention therefore is to provide a <sup>method</sup> ~~system~~ for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

A particular object of the invention is to provide a panel-joining system which

- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
- can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
- makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- reduces tool wear when manufacturing floor panels with hard surface layers;

- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- 5 - makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides <sup>method of laying</sup> ~~a system for making a~~ joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

- 15 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

- a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in
- 20
- 25

- that the locking device further comprises a strip integrated with the other of said panels, termed strip panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with its locking element received in the locking groove of the groove panel,
- 30
- 35



The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-

5 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking

10 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a <sup>method</sup> ~~system~~ is provided which permits precise joining of thin floor panels having, for example, a thickness of the order of 3 mm and which at the same time

15 provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip panel and which exhibits an exact, predetermined distance from its bottom to the front side of the strip panel. The

20 part of the strip projecting behind the groove panel engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance from its bottom to the front side of the groove panel.

25 The thickness of the strip then is at least so great that the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This

30 levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material

35 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an alu-

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24. Juni 1999

Druckexemplar

~~AMENDED~~ CLAIMS

1. A method for laying and mechanically joining rectangular building panels (1, 2) in parallel rows, especially floor panels, said panels (1, 2) being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels (1, 2), characterised in that each panel (1, 2), at a rear side thereof, being provided with (i) a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being either a separate element connected to the panel or an extension of a lower part of the joint edge (3, 3') and extending throughout substantially the entire length of the corresponding edge (3, 3') and being provided with a locking element (8) projecting from the strip (6, 6'), and (ii) a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4') for receiving a locking element (8) of an adjacent panel, each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel; and in that said method includes the following two main locking steps S1 and S2 for laying a new panel:

S1: mechanically connecting a long edge (4 or 3) of the new panel to a long edge (3 or 4) of a previously laid first panel in a first row in such a way that the new panel and the first panel, as a result of said first main locking step S1, are mechanically locked to each other in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the locked long edges (3, 4), wherein said first main locking step S1 to this end includes

either:

- the substep of placing the new panel in a second row adjacent to said first row with the long edge (4) of the new panel provided with a locking groove (14) being placed upon and in contact with a locking strip (6) at the adjacent long edge (3) of the first panel, while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and
- the substep of subsequently angling down the new panel so as to accommodate the locking element (8) of said strip (6) of the first panel in said locking groove (14) of the new panel,

or

- the substep of placing the new panel in a second row adjacent to said first row with the locking strip (6) being provided at a long edge (3) of the new panel being inserted under the adjacent long edge (4) of the first panel being provided with a locking groove (14), while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and
- the substep of subsequently angling down the new panel so as to accommodate the locking element (8) of said strip (6) of the new panel in said locking groove (14) of the first panel,

and

S2 mechanically connecting a short edge of the new panel to a short edge of said previously laid second panel in the second row in such a way that the new panel and the second panel, as a result of said second main locking step S2, are mechanically locked to each other at said short edges (3', 4') in said first direction (D1) as well as in a third direction (D3) parallel to said principal plane and at right angles to the short edges (3', 4'), wherein said second main locking step S2 is performed by a linear displacement of the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element (8) of the strip (6') at one (4') of the short edges is received in the locking groove (14') at the other one (4') of the short edges, whereby the new panel, in its final laid position, is mechanically connected in two direction (D1, D2) at its long edge to the first panel and in two direction (D1, D3) at its short edge to the second panel.

2. A method as claimed in claim 1, wherein, as a result of said linear displacement of the new panel, the locking strip (6') located at the short edges (3', 4') to be locked together is bent downwards until the locking element (8) snaps up into the locking groove (14').

3. A <sup>method</sup> as claimed in claim 1 or 2, wherein the short edge (4') of the new panel to be locked to the short edge (3') of the second panel presents a locking groove (14') for engagement with a locking element (8) of the second panel.

4. A method as claimed in claim 3, wherein the new panel is angled down into a position where the end

portion of the new panel facing the second panel is placed upon and in contact with the locking strip (6') at the short edge (3') of the second panel.

5           5. A method as claimed in claim 1 or 2, wherein the short edge (3') of the new panel to be locked to the short edge (4') of the second panel presents a locking strip (6') with a locking element (8) for engagement with a locking groove (14') of the second panel.

10

6. A method as claimed in any one of claims 1-5, wherein said substep of angling down the new panel is performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

15

7. A method according to any one of claims 1-6, wherein the new panel, after having been laid and mechanically joined to the first and to the second panel, can be taken up by angling the new panel and the second panel together upwards in relation to the first panel and subsequently loosening the new panel from the second panel by angling and/or linear displacing the new panel in relation to the second panel.

20

8. A method as claimed in claim 7, wherein said step of angling the new panel and the second panel together in relation to the first panel can be performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

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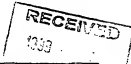


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**Bemerkungen • Remarks • Remarques**

EP applications 98106535.2-2303 and 98201555.4-2303 in the name of Vålinge Aluminium AB

Reference is made to our telephone conversation.

Please find attached a copy via fax of the EPO Form 2004 for both applications.

The original letters will leave the EPO per registered mail on 11/08/99.

Best regards and nice weekend.

**6.08.1999**

**Datum • Date**

**Unterschrift • Signature**

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Application No. 98 106 535.2-2303	Ref. 2980609	Date 11.08.99
Applicant Välinge Aluminium AB		

#### Communication under Rule 51(4) EPC

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

#### Description, pages:

1-19 as originally filed

#### Claims, No.:

1-6 as received on 24.06.1999 with letter of 17.06.1999

#### Drawings, sheets:

1-6 as originally filed

With the following amendments to the above-mentioned documents by the Examining Division:

Description, pages: 1\*,5\*,6\*,8\*

Claim, No.: 3

#### Comments:

Article 84 EPC: The claims shall define the matter for which protection is sought.  
 They shall be clear and concise and be supported by the description



Date

11.08.99

Sheet 2

Application-No.: 98 106 535.2

A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2056.

You are requested to state your approval of the text specified above within four months of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 1995, 641.

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 167(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Himmel, U  
For the Examining Division  
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Enclosure(s): Form 2056  
3 Copies of the relevant documents

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In the second alternative, the long side of the new panel provided with a strip is inserted under the grooved long edge of the previously laid first panel. Support for the second alternative can be found in the application as filed on page 18, line 35 to page 19, line 2.

3. With respect to the Art. 123(2) objection relating to the play feature, it is respectfully submitted that the feature in question is not an essential feature to the inventive laying method claimed in the present application. The laying method can be clearly defined without this feature.

The subject matter for which protection is sought in the parent application is a system, i.e. apparatus claims. The parent application does not include any method claims. However, the parent application contains additional subject matter for which protection is not sought in the parent application, including especially the method for laying panels for which protection is now sought in the present divisional application. More specifically, the disclosure of the parent application includes, at least, two different inventions:

- A locking system (apparatus claims)
- A method for assembling building panels for enabling 4-side locking, by an angling-displacing-snapping technique.

Thus, the present divisional application seek protection for a second, different invention, and features that are essential to the first invention claimed in the parent application are necessarily not essential to a second, different invention claimed in a divisional. More specifically, in the present application the method as claimed in claim 1 is described on page 10, lines 6-28, without any mention the feature in question. The inventive method, including its different steps and substeps, is clearly disclosed in the description and clearly defined in the claims without this feature.

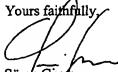
4. Claim 1 has been clarified according to your suggestion in respect of the two alternative embodiments of the strip (separate component or one-piece embodiment).

In amended claim 1, the "third direction D3" has been used according to your suggestion. Thus, D3 is the direction at right angles to the locked short edges and at right angles to the main plane of the panels.

As to the last objection under paragraph 4 in your Communication, it is not clear what amendments are considered by the Examiner. It is stated that the "shape" of the projections and grooves should be more clearly defined. However, the actual shape of the locking element and of the locking groove can be altered in many different way within the scope of the inventive method. A more specific definition of the structural shape would lead to an unjustified limitation of the scope of protection. Claim 1 identifies all essential features of these components, such as their locations in relation to the panel and the joint edges and their functions. In order to make the claim somewhat clearer, amended claim 1 hereby submitted now states that the locking element projects from the strip and that the locking groove is for receiving the locking element. The last-mentioned feature can be considered as defining the shape of the two components in functional terms. In case the Examiner should consider it necessary to make additional clarifications, a telephone discussion on this issue is respectfully requested.

5. Clear copies of the drawings previously submitted from the priority application is hereby enclosed.
6. Reference signs have been inserted into in the claims in order to comply with Rule 29 EPC.

Yours faithfully,

  
Sören Givert  
Authorised Representative  
AWAPATENT AB

Encls  
New, amended claims 1-8  
Drawings from priority application

## AMENDED CLAIMS

1. A method for laying and mechanically joining rectangular building panels (1, 2) in parallel rows, especially floor panels, said panels (1, 2) being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels (1, 2), characterised in that each panel (1, 2), at a rear side thereof, being provided with (i) a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being either a separate element connected to the panel or an extension of a lower part of the joint edge (3, 3') and extending throughout substantially the entire length of the corresponding edge (3, 3') and being provided with a locking element (8) projecting from the strip (6, 6'), and (ii) a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4') for receiving a locking element (8) of an adjacent panel, each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel; and in that said method includes the following two main locking steps S1 and S2 for laying a new panel:

S1: mechanically connecting a long edge (4 or 3) of the new panel to a long edge (3 or 4) of a previously laid first panel in a first row in such a way that the new panel and the first panel, as a result of said first main locking step S1, are mechanically locked to each other in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the locked long edges (3, 4), wherein said first main locking step S1 to this end includes

either:

- the substep of placing the new panel in a second row adjacent to said first row with the long edge (4) of the new panel provided with a locking groove (14) being placed upon and in contact with a locking strip (6) at the adjacent long edge (3) of the first panel, while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and
- the substep of subsequently angling down the new panel so as to accommodate the locking element (8) of said strip (6) of the first panel in said locking groove (14) of the new panel,

or

- the substep of placing the new panel in a second row adjacent to said first row with the locking strip (6) being provided at a long edge (3) of the new panel being inserted under the adjacent long edge (4) of the first panel being provided with a locking groove (14), while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and
- the substep of subsequently angling down the new panel so as to accommodate the locking element (8) of said strip (6) of the new panel in said locking groove (14) of the first panel,

and

S2 mechanically connecting a short edge of the new panel to a short edge of said previously laid second panel in the second row in such a way that the new panel and the second panel, as a result of said second main locking step S2, are mechanically locked to each other at said short edges (3', 4') in said first direction (D1) as well as in a third direction (D3) parallel to said principal plane and at right angles to the short edges (3', 4'), wherein said second main locking step S2 is performed by a linear displacement of the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element (8) of the strip (6') at one (4') of the short edges is received in the locking groove (14') at the other one (4') of the short edges, whereby the new panel, in its final laid position, is mechanically connected in two direction (D1, D2) at its long edge to the first panel and in two direction (D1, D3) at its short edge to the second panel.

2. A method as claimed in claim 1, wherein, as a result of said linear displacement of the new panel, the locking strip (6') located at the short edges (3', 4') to be locked together is bent downwards until the locking element (8) snaps up into the locking groove (14').

3. A as claimed in claim 1 or 2, wherein the short edge (4') of the new panel to be locked to the short edge (3') of the second panel presents a locking groove (14') for engagement with a locking element (8) of the second panel.

4. A method as claimed in claim 3, wherein the new panel is angled down into a position where the end

5            5. A method as claimed in claim 1 or 2, wherein the short edge (3') of the new panel to be locked to the short edge (4') of the second panel presents a locking strip (6') with a locking element (8) for engagement with a locking groove (14') of the second panel.

6. A method as claimed in any one of claims 1-5, wherein said substep of angling down the new panel is performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

7. A method according to any one of claims 1-6, wherein the new panel, after having been laid and mechanically joined to the first and to the second panel, can be taken up by angling the new panel and the second panel together upwards in relation to the first panel and subsequently loosening the new panel from the second panel by angling and/or linear displacing the new panel in relation to the second panel.

8. A method as claimed in claim 7, wherein said step of angling the new panel and the second panel together in relation to the first panel can be performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

## AMENDED CLAIMS

1. A method for laying and mechanically joining rectangular building panels (1, 2) in parallel rows, especially floor panels, said panels (1, 2) being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels (1, 2), characterised in that each panel (1, 2), at a rear side thereof, being provided with (i) a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being ~~either integrated with the panel as a separate element connected to the panel or as an extension of a lower part~~ of the joint edge (3, 3') and extending throughout substantially the entire length of the corresponding edge (3, 3') and being provided with a ~~projecting~~ locking element (8) projecting from the strip (6, 6'), and (ii) a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4') for receiving a locking element (8) of an adjacent panel, each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel; and in that said method includes the following two main locking steps S1 and S2- for laying a new panel:

S1: mechanically connecting a long edge (4 or 3) of the new panel to a long edge (3 or 4) of a previously laid first panel in a first row in such a way that the new panel and the first panel, as a result of said first main locking step S1, are mechanically locked to each other in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the locked long edges (3, 4), wherein said first main locking step S1 to this end includes



either:

- 5       - the substep of placing the new panel in a second row adjacent to said first row with the long edge (4) of the new panel provided with a locking groove (14) being placed upon and in contact with a locking strip (6) at the adjacent long edge (3) of the first panel, while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and
- 10
- 15       - the substep of subsequently angling down the new panel so as to accommodate the locking element (8) of said strip (6) of the first panel in said locking groove (14) of the new panel,
- 20       or
- 25       - the substep of placing the new panel in a second row adjacent to said first row with the locking strip (6) being provided at a long edge (3) of the new panel being inserted under the adjacent long edge (4) of the first panel being provided with a locking groove (14), while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and
- 30
- 35       and:
- the substep of subsequently angling down the new panel so as to accommodate the locking element (8) of said strip (6) of the new panel in said

locking groove (14) of the first panel,

and

- 5 S2 — mechanically connecting a short edge of the new panel to a short edge of said previously laid second panel in the second row in such a way that the new panel and the second panel, as a result of said second main locking step S2, are mechanically locked to each other at said short edges (3', 4') in said first direction (D1) as well as in a second-third direction (D2/D3) parallel to said principal plane and at right angles to the short edges (3', 4'), wherein said second main locking step S2 is performed by a linear displacement of the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element (8) of the strip (6') at one (4') of the short edges is received in the locking groove (14') at the other one (4') of the short edges, whereby the new panel, in its final laid position, is mechanically connected in two direction (D1, D2) at its long edge to the first panel and in two direction (D1, D3) at its short edge to the second panel.

25

- ~~2. A method for laying and mechanically joining rectangular building panels in parallel rows, especially floor panels, said panels being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised in that each panel, at a rear side thereof, being provided with (i) a locking strip at one long edge and at one short edge, each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part~~

of the joint edge and extending throughout substantially the entire length of the corresponding edge and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel, and in that said method includes the following two main locking steps S1 and S2 for laying a new panel:

S1: mechanically connecting a long edge of the new panel to a long edge of a previously laid first panel in a first row in such a way that the new panel and the first panel, as a result of said first main locking step S1, are mechanically locked to each other in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the locked long edges, wherein said first main locking step S1 to this end includes the substep of placing the new panel in a second row adjacent to said first row with the locking strip being provided at a long edge of the new panel being inserted under the adjacent long edge of the first panel being provided with a locking groove, while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and the substep of subsequently angling down the new panel so as to accommodate the locking element of said strip of the new panel in said locking groove of the first panel,

and,

S2: mechanically connecting a short edge of the new panel to a short edge of said previously laid second panel in the second row in such a way that the new panel and the second panel, as a result of said second main locking step, are mechanically locked to each other

at said short edges in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the short edges, wherein said second main locking step 32 is performed by a linear displacement of the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of the strip at one of the short edges is received in the locking groove at the other one of the short edges, whereby the new panel, in its final laid position, is mechanically connected in two direction (D1, D2) at its long edge to the first panel and at its short edge to the second panel.

32. A method as claimed in claim 1 or 2, wherein, as a result of said linear displacement of the new panel, the locking strip (6') located at the short edges (3', 4') to be locked together is bent downwards until the locking element (8) snaps up into the locking groove (14').

34. A method for producing a floor as claimed in any one of claims 1-3 claim 1 or 2, wherein the short edge (4') of the new panel to be locked to the short edge (3') of the second panel presents a locking groove (14') for engagement with a locking element (8) of the second panel.

45. A method as claimed in claim 43, wherein the new panel is angled down into a position where the end portion of the new panel facing the second panel is placed upon and in contact with the locking strip (6') at the short edge (3') of the second panel.

56. A method as claimed in any one of claims 1-3 claim 1 or 2, wherein the short edge (3') of the new panel to be locked to the short edge (4') of the second panel presents a locking strip (6') with a locking

element (8) for engagement with a locking groove (14') of the second panel.

76. A method as claimed in any one of claims 1-65,  
5 wherein said substep of angling down the new panel is performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

10 87. A method according to any one of claims 1-76, wherein the new panel, after having been laid and mechanically joined to the first and to the second panel, can be taken up by angling the new panel and the second  
15 panel together upwards in relation to the first panel and subsequently loosening the new panel from the second panel by angling and/or linear displacing the new panel in relation to the second panel.

98. A method as claimed in claim 87, wherein said  
20 step of angling the new panel and the second panel together in relation to the first panel can be performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

25 ~~10. A method for producing a floor, comprising the step of manufacturing a plurality of rectangular floor panels provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised by the step of providing each panel, during the manufacturing and at the rear side of the panel, with (i) a locking strip at one long edge and at one short edge, each locking strip  
30 being integrated with the panel as a separate element connected to the panel or as an extension of a lower part of the joint edge and extending throughout substantially~~  
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direction (D2) with respect to the thus connected long edges, wherein said long edges, in the thus angled down position of the new panel, being in engagement with each other and thereby mechanically locked together in said first direction (D1) also, and finally

3. displacing the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of one of the short edges snaps up into the locking groove of the other one of the short edges, whereby the new panel and the second panel are mechanically connected with each other in both in said first direction (D1) and in said second direction (D2) with respect to the thus connected short edges.

11. A method for producing a floor, comprising the step of manufacturing a plurality of rectangular floor panels provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised by the step of providing each panel, during the manufacturing and at the rear side of the panel, with (i) a locking strip at one long edge and at one short edge, each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part of the joint edge and extending throughout substantially the entire length of the corresponding edge and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel,

wherein said integrated strips, said grooves and said locking elements are provided during the manufacturing in such a way that:

- (i) ~~when two adjacent panels have been mechanically joined together along adjacent edges thereof, a strip of one of the panels projects on the rear side of the other panel with the locking element of said strip being received in a locking groove of the other panel, thereby locking the two panels to each other also in a second direction (D2) parallel to said principal plane and at right angles to the joined edges; and~~
- (ii) ~~the following laying steps 1-3 can be performed for producing the floor when a new panel is laid and mechanically connected to a long edge of a previously laid first panel in a first row as well as to a short edge of a previously laid second panel in an adjacent second row, said first and second panels being already mechanically connected to each other at adjacent long edges thereof:~~
1. ~~placing the new panel in the second row, while holding the new panel at an angle relative to a principal plane of the first panel, such that the new panel is spaced from its final longitudinal position relative to said second panel and such that a locking strip provided at a long edge of the new panel is inserted under the adjacent long edge of the first panel being provided with a locking groove;~~
  2. ~~subsequently angling down the new panel so as to accommodate the locking element of said strip of the new panel in said locking groove of the first panel, whereby the new panel and the first panel are mechanically connected with each other in said second direction (D2) with respect to the thus connected long edges, wherein said long edges, in the thus angled down position of the new panel, being in engagement with each other and thereby mechanically locked together in said first direction (D1) also; and finally~~
  3. ~~displacing the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of~~



one of the short edges snaps up into the locking groove of the other one of the short edges, whereby the new panel and the second panel are mechanically connected with each other in both in said first direction (D1) and in said second direction (D2) with respect to the thus connected short edges.

12. A method for producing a floor as claimed in claim 10 or 11, wherein the locking strip located at the short edges to be locked together is provided in such a way that it is bent downwards as a result of displacing the new panel, until the locking element snaps up into the locking groove.

13. A method for producing a floor as claimed in any one of claim 10-12, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking groove for engagement with a locking element of the second panel.

14. A method for producing a floor as claimed in claim 13, wherein the new panel is angled down into a position where the end portion of the new panel facing the second panel is placed upon and in contact with the locking strip at the short edge of the second panel.

15. A method for producing a floor as claimed in any one of claims 10-12, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking strip with a locking element for engagement with a locking groove of the second panel.

FIG 1

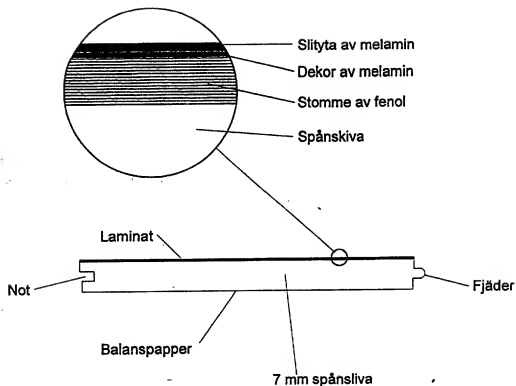
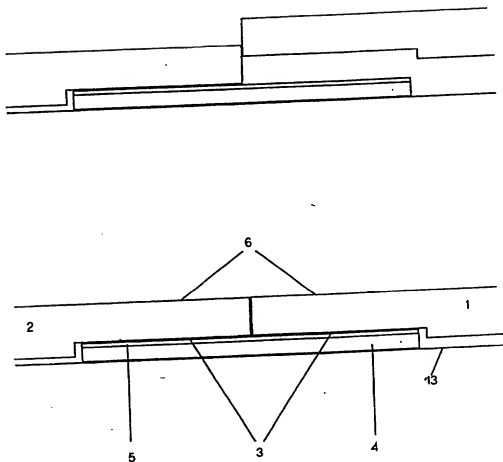
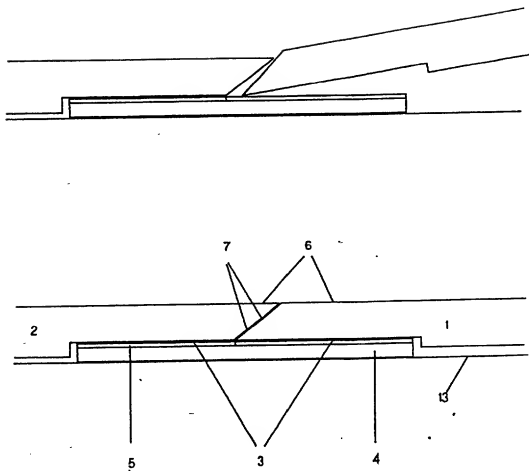


FIG 2



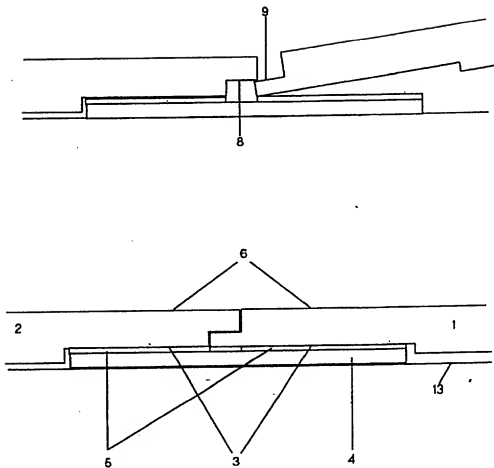
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FIG 3



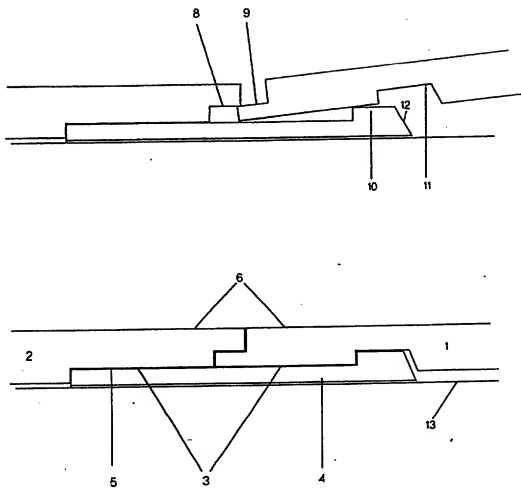
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FIG 4



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FIG 5





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**Telephone Numbers:**

Primary Examiner (+49-89) 2399-2466  
 (substantive examination)

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 (Formalities and other matters)



Application No. 98 106 535.2-2303	Ref. 2980609	Date 24. 03. 99
Applicant Välinge Aluminium AB		

Communication pursuant to Article 96(2) and Rule 51(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(3) and 83(2) and (4) EPC.

Amendments to the description, claims and drawings are to be filed where appropriate within the said period in three copies on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



PLUGGE HB  
 Primary Examiner  
 for the Examining Division

Enclosure(s): 3 page/s reasons (Form 2906)

90005744 022701



The examination is being carried out on the following application documents:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

**Description, pages:**

1-19 as originally filed

**Claims, No.:**

1-15 as originally filed

**Drawings, sheets:**

1-6 as originally filed

1. The application, a divisional application stemming from parent application EP0698162, appears to introduce subject-matter which extends beyond the content of the (parent) application as filed, contrary to Article 123(2) EPC.

Claims 10 to 15 are directed to a **method for producing a floor**, whereas the original application disclosed no such method. Furthermore, the method claims in the present (divisional) application are not drafted in terms of method steps, but in terms of the technical features of the panel and the method of installation. It is submitted that the subject matter for which protection was originally sought comprises not a method of manufacture, but rather the panel per se and the method of laying.

Claims 10 to 15 ought therefore to be deleted from the application, as well as the text in the description pertaining to the method of manufacture.

2. The examiner questions whether there is support in the original filing for the subject matter of claim 2. The laying method claimed in claim 1 appears to be that illustrated in the figures. The applicant is invited to indicate the support in the parent application for the variant of laying the panels as claimed in claim 2.

In the event that that support can be established, it is suggested, for reasons of clarity, that claims 1 and 2 be combined using the either/or formulation. This would assist the reader in establishing the scope of the two very similar embodiments.





## Bescheid/Protokoll (Anlage)

Datum  
Date 09.09.99

## Communication/Minutes (Annex)

Blatt  
Sheet 2  
Feuille

## Notification/Procès-verbal (Annexe)

Anmelde-Nr.:  
Application No.: 98 106 535.2  
Demande n°:

3. In the originally filed claim 1, it was stated that the panels, when joined together, have play so as to be able to occupy a relative position in the "second" direction. This feature is not claimed in the present claim 1 (and claim 2).

fact  
+  
movement

The applicant is requested to state his position with regard to contravention of the requirements of Article 123(2) EPC. As there is no disclosure in the originally filed application that this feature is not an essential feature, it should be included in claim 1 (and claim 2).

could  
be  
applied

4. In respect of clarity (article 84 EPC) the following wording in claim 1 (and claim 2) should be addressed:

- The wording, in lines 11 to 13, "... each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part ..." should be amended to read "... each locking strip being either a separate element connected to the panel or an extension of a lower part ..." to make the intended limitation clear.
- If the **first direction** (D1) is defined as being at right angles to the principal plane of the panels, and a **second direction** (D2) as being parallel to said principal plane and at right angles to the locked **long** edges, then the definition of another **second direction** (D2) being parallel to said principal plane and at right angles to the **short edges** (toward the end of the claim) leads to a lack of clarity. It is proposed that the latter reference to a second direction be changed to a third direction D3, being perpendicular to directions D1 and D2.
- The wording "... and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel ..." is unclear. The shape of the projections and grooves needs to be more clearly defined to make the intended limitation clear. Without such a clarification, the subsequent method steps are indeterminate.

} ice

} 12th

98005744-02701



The applicant is requested to file amended claims which take the above comments into account.

5. The translation of the priority document for the parent application filed with the EPO on 8.7.1998, and the priority document itself, filed with WIPO on 16.6.1994, contain indecipherable drawings. As the content of the present application appears to go beyond the disclosure of the priority document, at least insofar as the text is concerned, the applicant is requested to file clear copies of the drawings filed with the priority filing SE9301595-6.

It should be noted that the document WO-A-9313280 is prior art in respect of the subject matter of the present application for which no priority rights can be accorded. The applicant is requested to take account of this document when redrafting the claims.

6. Reference signs in parentheses should be inserted in the claims to increase their intelligibility, Rule 29(7) EPC. This applies to both the preamble and characterising portion (see the Guidelines, C-III, 4.11).
7. The applicant is requested to file amendments taking the above comments into account.

90005744-022701



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PATENT DEPARTMENT

Delivery Date

12.03.99

an/Ref./Ref. 2980609	Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°. 98106535.2-2303/0855482
Anmelder/Applicant/Demandeur/Propriétaire/Inventor/Titulaire Välinge Aluminium AB	

COMMUNICATION PURSUANT TO ARTICLE 115(2) EPC

Please find enclosed observations by a third party concerning the patentability of the invention of the above-mentioned patent application. That person is not a party to the proceedings before the EPO (Art. 115(1) EPC).

Under Article 115(2) EPC you may comment on the observations.

Formalities Officer  
Tel. No. 089/2399 - 2949

Ursula Moyn-Khatami

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ERHARDTSTRASSE 27

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U/V Ref:

O/N Ref. A.14367  
MB/sh

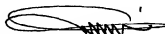
9 February 1999

Dear Sirs,

re: European patent application No. 98106535.2 (publ.No. 0.855.482)  
in the name of: VÄLINGE ALUMINIUM AB. 2303

We refer to your letter of 18 January 1999 and enclose herewith a copy of the observation under article 115 EPC, as well as copies of the opposition documents filed (in English).

Yours faithfully.



E. Donné M.Sc.  
European Patent Attorney

Encl.



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FORA3

23.02.99 10h

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\* DUPLIKATA - (W) \*

Bureau M.F.J. Bockstael nv

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EUROPEAN PATENT OFFICE  
ERHARDTSTRASSE 27

D-80298 MÜNCHEN  
DUITSLAND

A.13586  
GV/sr

7 October 1997

Dear Sirs,

re: European patent application no 94915725 (Publ.No 0.698.162).  
in the name of : VALINGE ALUMINIUM AB.

Under article 115 EPC, we present following observations, regarding the above mentioned application.

In the reply of the applicant dated 26 June 1997, (in response to the first examination report of 7 May 1997) the applicant filed a primary and a secondary request of new claims.

Claim 1 of the primary request, the scope of which is larger than the scope of the originally filed claim 1, is based on the assertion by the applicant that the feature that two panels engaged into each other can mutually be displaced in their longitudinal direction is new (citation: "... the mutual displacement of the panels in the direction of the joint edges is an essential feature of the invention...").

We would like to draw the Examiner's attention to the fact that the feature that the panels can be mutually displaced in longitudinal direction, is common technology for as long as flooring panels (provided with tongue and groove) exist.

./.

Indeed, as shown in enclosure 1, when engaging a flooring panel A with already installed flooring panels B and C, the flooring panel A is first coupled to the flooring panels B (tongue and groove are coupled), and subsequently the flooring panel A, in coupled condition, is moved to flooring panel C, as shown by arrow F, e.g. by exerting a force on the end E by means of a hammer.

It is clear that in practice it is never possible to couple flooring panel A to flooring panel B directly from the beginning closely to the flooring panel C.

It is clear that this technique already exists as long as flooring panels exist which are provided with tongue and groove.

\*  
\* \*

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Also the document WO 93/13280, which was cited in the search report of the abovesaid European patent application, clearly discloses panels which in coupled condition can be mutually displaced in longitudinal direction. Indeed, as shown in the drawings and as described in the text of WO 93/13280, the legs 2-3 fit into "SLOTS" 14-15, which means that there is no obstruction which can hinder a mutual displacement of two coupled panels in the longitudinal direction. Indeed, when for example exerting a force in longitudinal direction on the panel 13, this panel 13 will be displaced in that direction, whereby it is sliding with the slot 15 over the leg 3.

That a mutual displacement between the two panels of JUNKERS (WO 93/13280) MUST be possible is also clear when taking in account their commercialised product. Hereto we enclose photographs of this product (photographs 1 to 5 of enclosure 2), as well as drawings (enclosures 3 and 4) which are prepared from enlargements of photographs 1 and 2.

./.

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From this commercialised product, it is clear that the flooring panels of JUNKERS are provided with tongue and groove at the longitudinal edges as well as at the short edges. As tongues and grooves are provided at both, longitudinal and short edges, it is clear that the panels of JUNKERS can only be coupled to each other by first engaging the longitudinal edges of two adjacent panels and subsequently displacing the last coupled panel in longitudinal direction, in order to obtain that also the coupling at the shorter edges becomes realised. It is clear that the coupling of the panels at the short edges should not be possible when the panels cannot be moved in longitudinal direction.

It should also be noted that, after having provided the flooring board of JUNKERS with a plate-shaped body 1 as disclosed in WO 93/13280, (see also photograph 1), a structure is obtained which shows all features of claim 1 of the primary request.

For the reasons explained above, we are of the opinion that at least claim 1 of the primary request does not fulfill the requirements of article 54 EPC.

It is respectfully requested that the Examiner handling the European patent application no 94915725 should take in consideration the above comments.

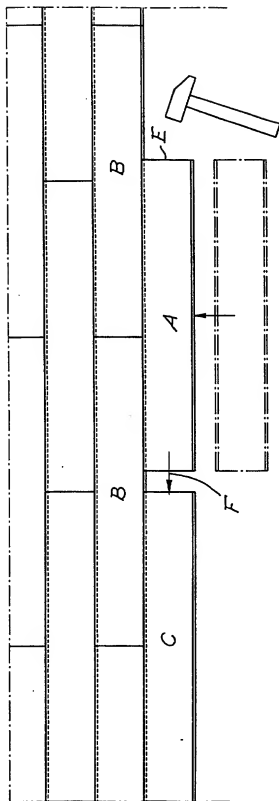
Yours faithfully.



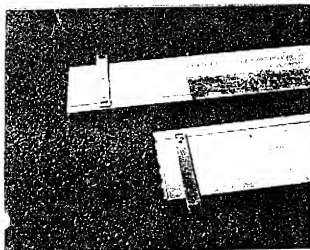
A.O. E. Donné M.Sc.  
European Patent Attorney

Encl.

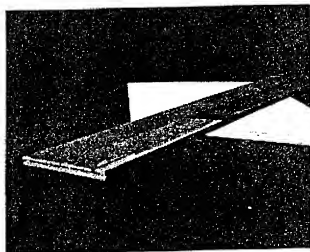
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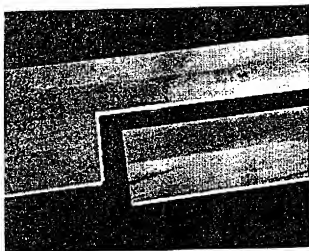




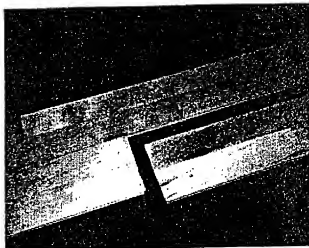
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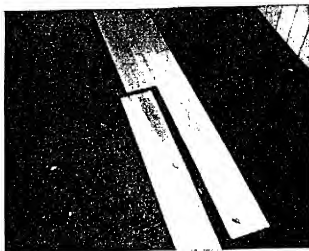
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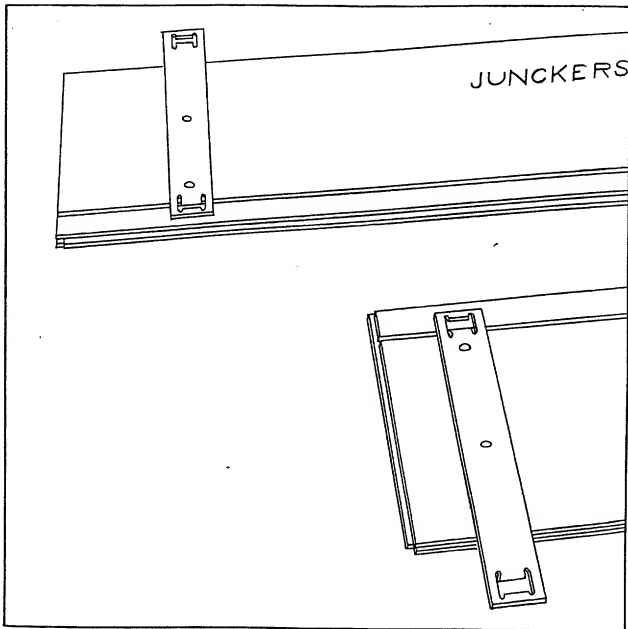
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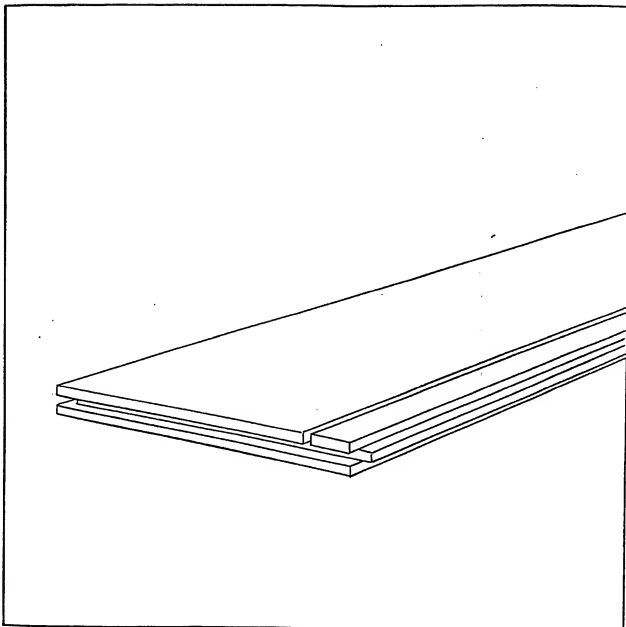
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 DUITSLAND

U/V Ref:

ON Ref: A.13586  
 GV/mb

24 April 1998

Dear Sirs,

re: European patent application No. 94915725.9 (Publ.No. 0.698.162)  
 in the name of: VÄLINGE ALUMINIUM AB.

Under art. 115 EPC, we wish to file following observations, regarding  
 the above mentioned European patent application.

These observations consist, on the one hand, of a reaction to the  
 letter of the representative of VÄLINGE ALUMINIUM AB dated 23 February  
 1998, and, on the other hand, of observations relating to art.123 EPC.

\*  
 \* \*

Observations regarding the letter dated 23 February 1998.

In his letter of reply, the representative of the applicant tries to explain that the wording of claim 1 of the secondary request in fact covers the same subject-matter as claim 1 of the main request. This means that the representative of the applicant is of the opinion that both the embodiments showing a definite play, and the embodiments showing no play are covered by claim 1 of the main request.

./.

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More particularly, the representative of applicant now tries to explain that the word "can" in the expression "the panels, when joined together, can occupy a relative position in said second direction where a play exists between...", means that the play can or cannot exist. In our opinion this is a clear misinterpretation of claim 1 with the intention to enlarge the scope of this claim.

In fact the word "can" refers to the word "occupy" and not to the word "exists".

The expression "where a play exists" in fact means "whereby a play exists", which means that there is always a play. Due to the presence of the play the panels "can" occupy a relative position, which means that they "have the possibility" to occupy different positions.

It is clear that the statement of the representative of the applicant renders the wording of claim 1 of the secondary request unclear. We do understand that we cannot intervene in the proceedings at this time, but it is expected that in case that a patent should be granted, claim 1 should be formulated in a clear and concise manner, as required by art. 84 EPC and that ambiguous terms are excluded, by clearly stating the existence of the play.

Furthermore, we would like to draw the attention of the Examiner to the fact that the statement "... the invention as defined in claim 1 differs also in other aspects from the closest prior art." (see letter of 23 February 1998 of the representative of the applicant, third paragraph of page 2) seems in contradiction with the statement of the representative's letter of 26 June 1997, second paragraph of second page, in which it is said that the limitation that the panels can occupy a relative position in said second direction was introduced in order to distinguish the invention from prior art spring clips (SE 450.141).

Furthermore, we would also like to draw the attention of the Examiner to the fact that, as explained further on, there is a clear difference between the expressions "integrated" and "integrally", and that the statement of the representative of the applicant on page 3, second paragraph, in which it is said that "integrated" means either fixedly connected to the panel, or integrally formed with the panel, is not correct.

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Regarding the possibility to mutually displace coupled boards in the direction of the joint edges (see second full paragraph on page 3 of the representative's letter dated 23 February 1998), it should be noted that such feature is clearly disclosed in GB 1.430.423, page 3 lines 10-15. Hereby it should also be noted that the joint structure shown in GB 1.430.423, apart from the fact that no separate strip and no play are used, is identical to the joint structure proposed in EP 0.698.162. This is very clear when turning figure 2 of GB 1.430.423 upside down.

Regarding the joint structure disclosed in GB 1.430.423, it is clear that this structure also provides in a locking action in two directions. This is described word for word on page 2, lines 105-113.

Important is also to note that the members 10 and 11 of GB 1.430.423 can be released again, as described on page 2, lines 29-31. It is obvious that to release the members 10 and 11 from each other, this will also be done by turning one member angularly away from the other panel, similar as disclosed in the last paragraph of claim 1 of the secondary request.

\*  
\* \*

Observations relating to art. 84 EPC and art.123 EPC.

Claim 14 is added during the proceedings and claims that the strip 6 is integrally formed with the strip panel 8, i.e. made in one piece with the strip panel 1.

This claim 14 depends on claims 1-4.

We would like to draw the attention of the Examiner to the fact that the embodiment in which the strip 6 is integrally formed with the strip panel 8 is described in conjunction with the use of the separate strip 74 (see description page 17, line 36 to page 18, line 17, as well as figure 5).

The description does not comprise a clear indication that the invention also relates to panels, having a strip 6 which is integrally formed with the panel, and in which the strip 74 is omitted. Consequently, present claim 14, as being dependent on claims 1-4, relates to subject-matter which extends beyond the content of the application as filed, and therefore in our opinion does not comply with art.123 EPC.

In fact claim 14 was added after the applicant noticed that competitors were manufacturing flooring panels having a strip portion which is formed in one piece with the panel and which were not provided with the strip 74.

Moreover, with respect to the above said, we also would like to draw the attention of the Examiner to the fact that the main object of the invention described in EP 0.698.162 substantially consists in providing a system for joining together building panels whereby the strength of the joint is no longer limited by the strength of the material of the panel itself or, vice versa, whereby the minimum thickness of the panel is no longer limited by requirements necessary to realise coupling portions at the edges (see objects and problems to be solved described in the introduction of the application, for instance page 4, lines 3-10 and page 5, lines 14-199). In other words EP 0.698.162 aims a solution to the problem that connections by means of a normal tongue and groove connection provided in the panel itself are not sufficiently strong and in certain applications impossible to produce.

According to the solution proposed in EP 0.698.162 this problem is solved either by using a separate strip 6 fixed to the panel, or by using a strip 6 which is in one piece with the panel but which in that case is provided with an additional strip 74. These strips 6-74 provide in a strong coupling portion.

It is clear that if in the embodiment of figure 5 the strip 74 is omitted, the posed problem is no longer solved. Consequently, also for this reason, an embodiment similar to the one in figure 5 but without the strip 74 is in our opinion not within the content of the application as filed.

In fact the strip 74 in the embodiment of figure 5 is provided to solve the same problems as these which are solved with the strip 6 in the other shown embodiments (this is clear from the description, especially from lines 7 to 9 on page 18, in which it is stated that the strip 74

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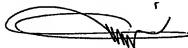
has "a width covering approximately the same surface as the separate strip 6 of the previous embodiments"). When the strip 74 is omitted, said problems are no longer solved, and the resulting embodiments are no longer within the scope of the invention.

Furthermore, added claim 14 is in our opinion not clear (art. 84 EPC) as the subject-matter of claim 14 is in contradiction with the subject-matter of claim 1 from which it depends. In claim 1 it is stated that the strip 6 is "integrated" with the panel, which means that the strip 6 consists of a separate element fixed to the panel (according to the Webster's dictionary "integrated" means "composed of separate parts united together to form a more complete entity"). In the added claim 14, it is said that the strip is "integrally" formed with the panel, which according to the applicant means that it is made in one piece. In our opinion, the term "integrally" is opposite to "integrated", and therefore claim 14 is not clear in that it refers to claims 1 to 4.

\*  
\* \*

It is respectfully requested that the Examiner handling the European patent application No. 94915725.9 should take in consideration the above formulated observations.

Yours faithfully.



E. Donné M.Sc.  
European Patent Attorney

90005744-022701



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\* DUPLIKATA - W \*

Bureau M.F.J. Bockstael nv

URGENT

EUROPEAN PATENT OFFICE  
ERHARDTSTRASSE 27

D-80298 MÜNCHEN  
DUITSLAND

A.13568  
GV/ec

19 December 1997

Dear Sirs,

re: European patent application No 94915725.9 (Publ.No. 0.698.162)  
in the name of: VÄLINGE ALUMINIUM AB.

---

Under article 115 EPC, we wish to file following observations,  
regarding the above mentioned European patent application.

\*  
\* \*

Claim 1 :

With respect to claim 1 ("second request") we would like to draw the attention of the Examiner to the prior-art document GB 2.256.023, of which we enclose herewith a copy. We also enclose an additional copy of figures 4 and 5 of this document, on which several indications have been made.

First of all, GB 2.256.023, page 1, second paragraph, discloses a joint which can be used for flooring. Consequently, this document clearly relates to the same technical field as the European patent application No. 94915725.9.

./.

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Secondly, it is clear that the joint disclosed in GB 2.256.023 also provides in first and second mechanical connections as claimed in the European patent application No. 94915725.9.

More particularly, as indicated on the enclosed copy of figure 4, the joint of GB 2.256.023 discloses the use of a strip 5, which projects on the rear side of a second panel 1' and which is provided with a locking element L (formed by side edge 17b), whereby this locking element is received in a locking groove G at the rear side of said panel 1'. Hereby the locking groove G consists in the recess bordered by the rib 10, on the one hand, and the lower side edge face 11b, on the other hand.

Furthermore, the panels 1 and 1', when joined together, can also occupy a relative position in the direction D2, similar as in the European patent application No. 94915725. More particularly, as indicated on the enclosed additional copy of figures 4 and 5, the joint of GB 2.256.023 clearly shows the "play" claimed in claim 1 of the "second request".

From the aforesaid, it is clear that all features of claim 1 are known from the British patent No. 2.256.023 and consequently the subject-matter of this claim is not new.

\*  
\* \*

With respect to the dependent claims of EP 94915725.9 we would like to draw the attention of the Examiner to the above-mentioned British patent No. 2.256.023, as well as to following documents:

US 3.310.919 -  
US 3.694.983 -  
US 3.859.000 -  
GB 424.057 -  
GB 1.430.423 -  
GB 2.117.813 -  
DE 2.502.992 -  
DE 3.041.781 -  
CH 200.949 -  
FR 2.568.295 -  
WO 9.313.280 -

Copies of the abstracts and/or most relevant pages of the above-listed documents are enclosed.

Claim 2:

From figure 4 of GB 2.256.023 one can clearly see that when two panels are pressed against each other and when subsequently panel 1' is turned angularly away from the strip S, the locking element can leave the locking groove G without contacting the locking surface 17b.

Consequently, for this reason, also the subject-matter of claim 2 is not new.

Claim 3:

As normally, panels as shown in GB 2.256.023 have a thickness which varies between approximately 8 mm and 2 cm, it is clear that the locking surface 17b is smaller than 2 mm. For this reason also claim 3 is anticipated by GB 2.256.023.

Claim 4:

GB 2.256.023 discloses that the first mechanical connection is provided by a joint edge (tongue 5) of the first panel, which is engaged between the joint edge (upper lip above groove 6) and the front side of the strip S of the second panel. Therefore we believe that the subject-matter of claim 4 is not new.

Claim 5:

The features of claim 5 that the strip is made of a material different from that of the panel and is fixedly mounted on the panel, are obvious taking into account that flooring panels provided with coupling strips of a material which differs from the material of the panel are already known from US 3.310.919, US 3.694.983 and US 3.859.000.

The feature of claim 5 can also be found in GB 2.117.813. As can be seen in the drawings of this document, the strips 12 and 13 are made of a different material than the plate 11. GB 2.117.813 relates to a wall panel. As the European patent application 94915725.9 relates to building panels, which means wall panels as well as flooring panels, GB 2.117.813 is in the same technical field.

Claim 6:

The feature of claim 6 that such strip 6 is received in a countersunk groove is also obvious, taking into account that the strips disclosed

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in US 3.310.919, US 3.694.983 and US 3.859.000 show also parts which are countersunk in the lower side of the panel.

Claim 9 :

The feature of claim 9 that the strip 6 is fixed to the strip panel 1 by means of a mechanical connection is also known of the above said three American patents, namely US 3.310.919, US 3.694.983 and US 3.859.000, as the strips are also fixedly mounted to the panels.

Claims 10 and 11 :

Using lips or the like which are bent or punched in order to realise a mechanical connection is a technique which is generally known for connecting elements to each other. The use of this technique in flooring panels is within the reach of persons skilled in the art.

According to our opinion, therefore claims 10 and 11 are not inventive.

Claim 12 :

Using a binder for connecting two parts to each other, in our opinion, offers no inventive step.

Claim 13 :

The feature of claim 13, stating that the strip is made of a flexible, preferably resilient material, such as sheet aluminium, is also obvious, as according to US 3.859.000 the strips are also made of a metallic material.

Claim 14 :

The feature that the strip 6 is integrally formed with the strip panel 1 is clearly known from the already mentioned document GB 2.256.023, and consequently is not new.

Furthermore the use of strips for coupling flooring panels, these strips being integral with the flooring panels, is generally known from GB 1.430.423, DE 25 02 992, CH 200.949, FR 2.568.295, DE 3.041.781 and GB 424.057.

Claim 15 :

The feature that the locking element consists in a locking edge extending continuously along the strip 6 is not new in view of the joint disclosed in GB 2.256.023. In the latter the locking edge is formed by edge 17b.

Furthermore, the use of continuous locking edges in flooring panels are generally known from GB 1.430.423, DE 25 02 992, CH 200.949, FR 2.568.295, DE 3.041.781 and GB 424.057.

Claim 16 :

The use of spaced apart locking elements is obvious taking into account the teachings of document WO 9313280 (cited in the international search report of the application in question). This document clearly shows that spaced apart elements can be used to couple flooring panels.

Claim 17 :

Claim 17 in fact states that each of the four edges of the panel is provided with a coupling element of the claimed coupling system.

This feature is obvious and not inventive, taking into account that it is generally known to provide flooring panels at each of the four edges with coupling means. Hereto we refer to the drawings of the panels disclosed in GB 424.057, FR 2.568.295 and CH 200.949.

Claim 18 :

The feature to fix an underlay to the rear side of the panel is known of FR 2.568.295. Figure 3 clearly shows the use of such underlay 44.

Claim 19 :

The feature of claim 19, stating that the underlay is fixed so as to cover this strip at least up to the locking element 8 is clearly anticipated by figure 3 of FR 2.568.295. In this figure 3, it can clearly be seen that the underlay 44 covers this strip up to the locking element (languette 31).

Claim 20 :

The use of a sealing strip is not inventive, as the use of a similar strip is already known from document GB 2.117.813 (beads 30 and 31).

\*  
\* \*

It is respectfully requested that the Examiner handling the European patent application No 94915725.9 should take in consideration the above comments.

Yours faithfully.

E. Donné M.Sc.  
European Patent Attorney

Encl.: 46 numbered pages.

0005744-02701

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D-80298

MÜNCHEN  
DUITSLAND

U/V Ref:

O/N Ref: A.13568  
GV/ec

COPY

19 December 1997

Dear Sirs,

re: European patent application No 94915725.9 (Publ.No. 0.698.162)  
in the name of: VÄLINGE ALUMINIUM AB.Under article 115 EPC, we wish to file following observations,  
regarding the above mentioned European patent application.\*  
\* \*Claim 1:With respect to claim 1 ("second request") we would like to draw the  
attention of the Examiner to the prior-art document GB 2.256.023, of  
which we enclose herewith a copy. We also enclose an additional copy of  
figures 4 and 5 of this document, on which several indications have  
been made.First of all, GB 2.256.023, page 1, second paragraph, discloses a joint  
which can be used for flooring. Consequently, this document clearly  
relates to the same technical field as the European patent application  
No. 94915725.9.

./.

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Secondly, it is clear that the joint disclosed in GB 2.256.023 also provides in first and second mechanical connections as claimed in the European patent application No. 94915725.9.

More particularly, as indicated on the enclosed copy of figure 4, the joint of GB 2.256.023 discloses the use of a strip S, which projects on the rear side of a second panel 1' and which is provided with a locking element L (formed by side edge 17b), whereby this locking element is received in a locking groove G at the rear side of said panel 1'. Hereby the locking groove G consists in the recess bordered by the rib 10, on the one hand, and the lower side edge face 11b, on the other hand.

Furthermore, the panels 1 and 1', when joined together, can also occupy a relative position in the direction D2, similar as in the European patent application No. 94915725. More particularly, as indicated on the enclosed additional copy of figures 4 and 5, the joint of GB 2.256.023 clearly shows the "play" claimed in claim 1 of the "second request".

From the aforesaid, it is clear that all features of claim 1 are known from the British patent No. 2.256.023 and consequently the subject-matter of this claim is not new.

\*  
\* \*

With respect to the dependent claims of EP 94915725.9 we would like to draw the attention of the Examiner to the above-mentioned British patent No. 2.256.023, as well as to following documents:

US 3.310.919  
US 3.694.983  
US 3.859.000  
GB 424.057  
GB 1.430.423  
GB 2.117.813  
DE 2.502.992  
DE 3.041.781  
CH 200.949  
FR 2.568.295  
WO 9.313.280

Copies of the abstracts and/or most relevant pages of the above-listed documents are enclosed.



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Claim 2:

From figure 4 of GB 2.256.023 one can clearly see that when two panels are pressed against each other and when subsequently panel 1' is turned angularly away from the strip S, the locking element can leave the locking groove G without contacting the locking surface 17b.

Consequently, for this reason, also the subject-matter of claim 2 is not new.

Claim 3 :

As normally, panels as shown in GB 2.256.023 have a thickness which varies between approximately 8 mm and 2 cm, it is clear that the locking surface 17b is smaller than 2 mm. For this reason also claim 3 is anticipated by GB 2.256.023.

Claim 4 :

GB 2.256.023 discloses that the first mechanical connection is provided by a joint edge (tongue 5) of the first panel, which is engaged between the joint edge (upper lip above groove 6) and the front side of the strip S of the second panel. Therefore we believe that the subject-matter of claim 4 is not new.

Claim 5 :

The features of claim 5 that the strip is made of a material different from that of the panel and is fixedly mounted on the panel, are obvious taking into account that flooring panels provided with coupling strips of a material which differs from the material of the panel are already known from US 3.310.919, US 3.694.983 and US 3.859.000.

The feature of claim 5 can also be found in GB 2.117.813. As can be seen in the drawings of this document, the strips 12 and 13 are made of a different material than the plate 11. GB 2.117.813 relates to a wall panel. As the European patent application 94915725.9 relates to building panels, which means wall panels as well as flooring panels, GB 2.117.813 is in the same technical field.

Claim 6 :

The feature of claim 6 that such strip 6 is received in a countersunk groove is also obvious, taking into account that the strips disclosed

in US 3.310.919, US 3.694.983 and US 3.859.000 show also parts which are countersunk in the lower side of the panel.

Claim 9 :

The feature of claim 9 that the strip 6 is fixed to the strip panel 1 by means of a mechanical connection is also known of the above said three American patents, namely US 3.310.919, US 3.694.983 and US 3.859.000, as the strips are also fixedly mounted to the panels.

Claims 10 and 11 :

Using lips or the like which are bent or punched in order to realise a mechanical connection is a technique which is generally known for connecting elements to each other. The use of this technique in flooring panels is within the reach of persons skilled in the art.

According to our opinion, therefore claims 10 and 11 are not inventive.

Claim 12 :

Using a binder for connecting two parts to each other, in our opinion, offers no inventive step.

Claim 13 :

The feature of claim 13, stating that the strip is made of a flexible, preferably resilient material, such as sheet aluminium, is also obvious, as according to US 3.859.000 the strips are also made of a metallic material.

Claim 14 :

The feature that the strip 6 is integrally formed with the strip panel 1 is clearly known from the already mentioned document GB 2.256.023, and consequently is not new.

Furthermore the use of strips for coupling flooring panels, these strips being integral with the flooring panels, is generally known from GB 1.430.423, DE 25 02 992, CH 200.949, FR 2.568.295, DE 3.041.781 and GB 424.057.

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Claim 15 :

The feature that the locking element consists in a locking edge extending continuously along the strip 6 is not new in view of the joint disclosed in GB 2.256.023. In the latter the locking edge is formed by edge 17b.

Furthermore, the use of continuous locking edges in flooring panels are generally known from GB 1.430.423, DE 25 02 992, CH 200.949, FR 2.568.295, DE 3.041.781 and GB 424.057.

Claim 16 :

The use of spaced apart locking elements is obvious taking in account the teachings of document WO 9313280 (cited in the international search report of the application in question). This document clearly shows that spaced apart elements can be used to couple flooring panels.

Claim 17 :

Claim 17 in fact states that each of the four edges of the panel is provided with a coupling element of the claimed coupling system.

This feature is obvious and not inventive, taking into account that it is generally known to provide flooring panels at each of the four edges with coupling means. Hereto we refer to the drawings of the panels disclosed in GB 424.057, FR 2.568.295 and CH 200.949.

Claim 18 :

The feature to fix an underlay to the rear side of the panel is known of FR 2.568.295. Figure 3 clearly shows the use of such underlay 44.

Claim 19 :

The feature of claim 19, stating that the underlay is fixed so as to cover this strip at least up to the locking element 8 is clearly anticipated by figure 3 of FR 2.568.295. In this figure 3, it can clearly be seen that the underlay 44 covers this strip up to the locking element (languette 31).

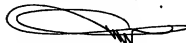
Claim 20 :

The use of a sealing strip is not inventive, as the use of a similar strip is already known from document GB 2.117.813 (beads 30 and 31).

\*  
\* \*

It is respectfully requested that the Examiner handling the European patent application No 94915725.9 should take in consideration the above comments.

Yours faithfully.



E. Donné M.Sc.  
European Patent Attorney

Encl.: 46 numbered pages.

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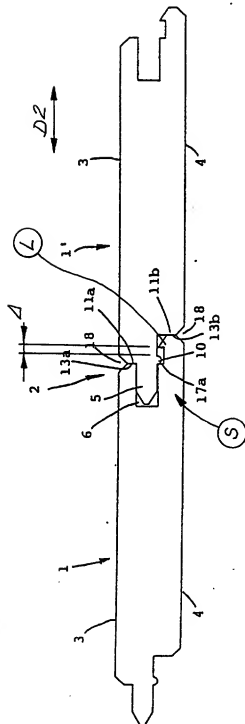


FIGURE 4.

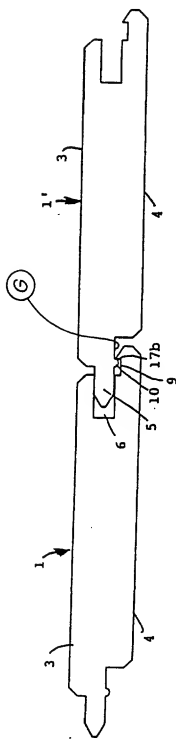
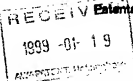


FIGURE 5.



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### Bemerkungen • Remarks • Remarques

EP-application 98106535.2

As requested by telephone, please find attached a copy of the letter "observations by a third party" of 06/01/99.

The original letter with enclosures will be forwarded to you as soon as the enclosures have been received (see communication of 18/01/99).

19.01.99

Datum • Date

Unterschrift • Signature



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BUREAU M.F.J. BOCKSTAELE  
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B-2000 Antwerpen  
 Belgique

Datum/Date

18.01.99

Zeichen/Ref./RM	Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°
2889609 A 14367 GV/sh VÖPPF599	98106535.2-2303/0855482
Anmelder/Applicant/Demandeur/Patenthaber/Propriétaire/Titulaire Vélings Aluminium AB	

# ACKNOWLEDGEMENT OF RECEIPT OF OBSERVATIONS BY THIRD PARTIES (Article 115 EPC)

I. Receipt of your letter dated ..06/01.99.....  
 is hereby acknowledged.

Under Article 115(1) EPC you will not be a party to the  
 proceedings before the European Patent Office.

II. In your letter the following documents are mentioned which were not  
 enclosed, ~~and which are not available in the EPO:~~  
 \*\*\*\*\*  
 Copies of the observations under Art. 115 EPC as well as  
 copies of the opposition-documents filed in respect to the  
 patent application 94915725.9.

You are asked to file copies of these documents within TWO MONTHS  
 of notification of this communication if they are to be taken into  
 account.

For the opposition/examining division  
 Tel. No. 089/2399 -2449

Françoise Ide

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EUROPEAN PATENT OFFICE  
ERHARDTSTRASSE 27

D-80298 MÜNCHEN  
DUITSLAND

UV Ref.:  
ON Ref.: A.14367  
GV/sh

6 January 1999

Dear Sirs,

re: European patent application No. 98106535.2 (publ.No. 0.855.482)  
in the name of: VALINCE ALUMINIUM AB.

Under article 115 EPC, we would like to file following observations  
regarding the above-mentioned European patent application.

The European patent application No. 98106535.2 comprises four  
independent claims, respectively claims 1, 2, 10 and 11. These claims  
relate to a method for laying and joining building panels and a method  
for producing a floor.

The contents of the parent European patent application No. 94913725.9  
is clearly restricted to flooring panels having a strip 6 provided with  
a projecting locking element 8 fitting in a locking groove 14, whereby  
between the locking surfaces of the locking element and the groove  
there exists a clear play (Delta).  
The examiner who is treating the parent patent application clearly  
stated that, according to the content of this parent application, the  
existence of the play is an essential feature which could not be  
deleted from the claims.

BELGIAN AND EUROPEAN PATENT ATTORNEYS — BENELUX AND EUROPEAN TRADE MARK ATTORNEYS

BANKEN-BANQUE: SBC 005-007518-48 • KB 400-8313001-77 • CL 815-0083750-81 • PCRCPC 000-007518-48 • HANRA 00 841 • BTW/VVA 84 • 02.02.00.00



2.

The claims of the divisional application No. 98106535.2 do not mention the presence of such play.

Therefore, in our opinion, the subject matter of the divisional application goes beyond the content of the application as originally filed, and consequently does not comply with article 123(2) EPC.

\* \*

Secondly it is respectfully requested that the examiner should take into consideration the observations which already have been filed under article 115 EPC in respect to the parent application as well as with the arguments and documents mentioned in the opposition which was filed on 4 January 1999 in respect to EP 0,698.162.

n° of parent appl. = 94915725.9

~~Yours faithfully,~~

E. Donné M.Sc.  
European Patent Attorney.

TIPAO 1

10/220-4450006

**AWAPATENT**Handled by  
Sören Giver/MPHelsingborg  
14 December 1998Our ref.  
2980609Attention  
Receiving SectionEuropean Patent Office  
P.B. 5818 - Patentlaan 2  
NL-2280 H.V. Rijswijk**SENT BY FAX (070) 3 40 30 16****VÄLINGE ALUMINIUM AB****European Patent Application No. 98106535.2-2303**

Dear Sirs,

In response to your Communication pursuant to Article 96(1) and Rule 51(1) EPC, dated 9 December 1998, you are hereby informed that the Applicant desires to proceed further with the above-identified application. Please note that a request for accelerated examination under the PACE program was made with a letter dated 7 October 1998.

Very truly yours,

Sören Giver  
Authorised Representative  
AWAPATENT AB

90005744-02270

**HELSINGBORG**      **VAT No. SE556082702301****STREET ADDRESS:**  
Berga allé 1  
HELSINGBORG  
SWEDEN**POSTAL ADDRESS:**  
Berga allé 1  
S-254 52 HELSINGBORG  
SWEDEN**Telephone**    +46 42 16 30 45  
**Fax**            +46 42 16 09 42  
**Telex**           32407  
**Email**          mail@awapatent.com**Other AWAPATENT offices:****MALMÖ (Head office and registered office):**  
STOCKHOLM    GÖTEBORG  
SÖDERHAMN    VÄXJÖ  
LIDKÖPING      VARBERG  
ÖSTERSUND     LUND

1998-12-14 12:59 G:\PAT\MP\KORRESP\MYND\B2980609.DOC

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P.B. 5818 - Patentaan 2  
2280 HV Rijswijk (ZH)  
32 (070) 3 40 30 40  
TX 31851 epo nl  
FAX (070) 3 40 30 16

Europäisches  
Patentamt

Eingangs-  
stempel

European  
Patent Office

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Section de  
Dépôt

Giver, Sören Bo

Awapatent AB,

P.O. Box 5117

200 21 Malmö

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1998 -12- 11

AWAPATENT, Malmö

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1998 -12- 14

AWAPATENT, Helsingborg



Datum/Date

09/12/98

ver/Ref./Ref.

2980609

Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°

98106535.2-2303 / 0855482

Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire

Välinge Aluminium AB

COMMUNICATION PURSUANT TO ARTICLE 96(1), RULE 51(1) EPC AND  
REFERENCE TO ARTICLE 79(2) EPC

The date on which the European Patent Bulletin mentions the  
publication of the European search report for the above-identified  
European patent application (publication number: 0855482) is  
18.11.98.

Since the request for examination of the above-identified European  
patent application was filed prior to the transmission of the European  
search report, you are hereby invited to indicate whether you desire  
to proceed further with the application.

If you do not reply to this invitation before the end of SIX MONTHS  
after the above-mentioned publication date, the application will  
be deemed to be withdrawn (Art. 96(3) EPC).

You are invited, if you wish, to comment on the European  
search report and to amend, where appropriate, the description,  
claims and drawings (Rule 51(1) EPC).

NOTE:

Any designation fees are also payable within SIX MONTHS of the above-  
mentioned publication date (Art. 79(2) EPC). This period for payment is  
applicable to extension fees as well.

RECEIVING SECTION



REGISTERED LETTER

EPO FORM 1082 (08.98)

SE\* 7001004 06/12/98  
011



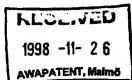
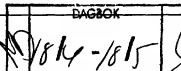
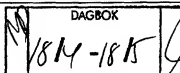
P.B. 5518 - Patentamt 2  
2200 HV Rijswijk (ZH)  
☎ (070) 3 46 30 40  
TX 31851 epo nl  
FAX (070) 3 46 30 16

Europäisches  
Patentamt  
Eingangs-  
stelle

European  
Patent Office  
Receiving  
Section

Office européen  
des brevets  
Section de  
Dépôt

Giver, Sören Bo  
Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE



Datum/Date  
24/11/98

Inventor/Édité	Anmeldung Nr./Application No./Demande n°	Patent Nr./Patent No./Brevet n°
2980609	98106535.2-2303	/ 0855482
Applicant/Deposant/Demandeur/Propriétaire/Titulaire Välinge Aluminium AB		

COMMUNICATION PURSUANT TO RULE 50 EPC  
REMINDER OF PAYMENT OF THE DESIGNATION FEES (ART. 79(2) EPC)  
AND OF THE EXAMINATION FEE (ART. 94(2) EPC)

The date on which the European Patent Bulletin mentions the publication  
of the European search report for the above-mentioned European patent  
application is: 18.11.98.

Your attention is drawn to Article 79(2) and (3) EPC as well as  
Article 94(2) and (3) EPC according to which within SIX MONTHS after the  
above-mentioned publication date of the search report

- the designation fee(s) must be paid
- a written request for examination must be filed as well as the  
examination fee must be paid (A written request for examination has  
been filed already).

The current rate of the designation fee for each contracting state  
designated is:

DEM	GBP	FRF	CHF	NLG	SEK	BEF/LUF	ITL	ATS	ESP	GRD	DKK
150	51	520	130	170	680	3100	152000	1070	12900	26800	590

PTE	IEP	FIM	CYP
15500	58	460	46

The current rate of the examination fee is:

DEM	GBP	FRF	CHF	NLG	SEK	BEF/LUF	ITL	ATS	ESP	GRD	DKK
2800	959	9660	2350	3200	12670	58700	2828000	20000	241400	500000	11000

PTE	IEP	FIM	CYP
289900	1077	8620	854

--/2

REGISTERED LETTER

EPO Form 1081 (06.98)  
011

SE\* 7011006 19/11/98

*M. B. Birse*  
3070



If at least one designation fee and the examination fee are not paid within the period laid down in Article 79(2) or 94(2) EPC, the application shall be deemed to be withdrawn (Arts. 79(3), 94(3) EPC).

Any extension fees are also payable within the above-mentioned period.

**NOTE TO USERS OF THE AUTOMATIC DEBITING PROCEDURE:**

**1) Designation fees**

Unless the EPO receives prior instructions to the contrary, the designation fees for the contracting states marked with a cross under No. 2 of Section 32 of the Request for Grant (EPO Form 1001, 07.97) will be debited on the last day of the period pursuant to Article 79(2) EPC. If no contracting states have been marked with a cross, ALL CONTRACTING STATES have been RECORDED by the EPO in order to avoid any resulting prejudice to the rights of the applicant. In this exceptional case, the DESIGNATION FEES FOR ALL CONTRACTING STATES will be DEBITED unless instructions to the contrary have reached the EPO within the basic period for paying the designation fees.

**2) Examination fee**

Unless the EPO receives prior instructions to the contrary, the examination fee will be debited on the last day of the period for payment.

For further details see the Arrangements for the automatic debiting procedure, Supplement to OJ EPO 06/1994.

**RECEIVING SECTION**



Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°:

98106535.2

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2

**AWAPATENT**Handlaggs av  
Sören Giver/MPHelsingborg  
1998-10-07Vår referens  
2980609Attention  
DG 2

European Patent Office

D-80298 MÜNCHEN


SENT BY FAX (089) 23 99 4465

VÄLINGE ALUMINIUM AB  
European Patent Application No. 98106535.2-2303  
Publication No. 855 482

Dear Sirs,

An accelerated examination under the PACE program is hereby respectfully requested in the above-identified case.

Very truly yours,

  
Sören Giver  
Authorised Representative  
AWAPATENT AB

HELSINGBORG

Org. nr. 556082-7023

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Övriga AWAPATENT-kontor:

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SÖDERHAMN  
LIDKÖPING  
ÖSTERSUND  
GÖTEBORG  
VÄXJÖ  
VARBERG  
LUND

1998-10-07 11:15 G:\PAT\MP\KORRESP\MYND\B2981378.DOC

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P B 5818 - Patentaan 2  
2280 HV Rijswijk (ZH)  
w (070) 340 2040  
t 31651 epo nl  
FAX (070) 340 3016

Europäisches  
Patentamt  
Zweigstelle in  
Den Haag  
Recherchen-  
abteilung

European  
Patent Office  
Branch at  
The Hague  
Search  
Division

Office Européen  
des Brevets  
Département A  
La Haye  
Division de la  
recherche

Giver, Sören Bo  
Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE



Delivery Date
30. 09. 98

Zeichner/Ref/RM	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire	98106535-2

Valinco Aluminium AB

### COMMUNICATION

The European Patent Office herewith transmits

- ☐ the European search report
- ☐ the declaration under Rule 45 EPC
- ☐ the partial European search report under Rule 45 EPC
- ☐ the supplementary European search report concerning the international application under Article 157 (2) EPC relating to the above-mentioned European patent application. Copies of the documents cited in the search report are enclosed.

The following specification given by the applicant have been approved by the Search Division:

- ☒ Abstract
- ☒ Title
- ☒ Figure
- ☐ The abstract was modified by the Search Division and the definitive text is attached to this communication
- ☐ The following figure will be published with the abstract, since the Search Division considers that it better characterises the invention than the one indicated by the applicant.

Figure:

- ☒ Additional copy (copies) of the documents cited in the European search report.

### REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.



EPO Form 1507.1 02/93




DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CL.8)
A,P	WO 93 13280 A (JUNCKERS INDUSTRIER A/S) 8 July 1993 * abstract, details 1,2,3,14 *	1-15	E04F15/14 E04F15/02 E04F13/08
A	US 3 538 665 A (P. GOHNER) 10 November 1970 * details 7,9 *	1-15	
A	DE 26 16 077 A (HEWENER, H.J.) 27 October 1977 * figure 1 *	1-15	
A	FR 1 293 043 A (ETABLISSEMENTS PIRAUD PLASTIQUES) 5 October 1962 * figure 2, details 8,9,10,11 *	1-15	
			TECHNICAL FIELDS SEARCHED (Int.CL.8)
			E04F A47G
The present search report has been drawn up for all claims			
Place of search STOCKHOLM		Date of completion of the search 24 August 1998	Examiner NYLUND ÖRJAN
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

90005744-02301

1

EP 0981 100 01/92 (PUB.01)



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 10 6535

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-08-1998

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9313280 A	08-07-1993	CA 2125876 A	08-07-1993
		EP 0624221 A	17-11-1994
		JP 7502580 T	16-03-1995
US 3538665 A	10-11-1970	NONE	
DE 2616077 A	27-10-1977	NONE	
FR 1293043 A	05-10-1962	NONE	

EPO FORM 1009

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

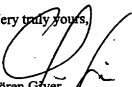
**AWAPATENT**Helsingborg  
10 September 1998Our ref.  
2980609Handled by  
Sören Giver/MPAttention  
Receiving SectionEuropean Patent Office  
P.B. 5818 - Patentlaan 2  
NL-2280 HV Rijswijk**SENT BY FAX (070) 3 40 30 16**VÄLINGE ALUMINIUM AB  
European Patent Application No. 98106535.2-2303  
Publication No. 855 482

Dear Sirs,

With reference to your Notification of 29 June 1998, we hereby can inform you of the correct address of the inventor as below.

Tony Pervan  
Skeppargatan 41  
S-114 52 STOCKHOLM

Very truly yours,

  
Sören Giver  
Authorised Representative  
AWAPATENT AB

90005744-022701

HELSINGBORG VAT No. SE556082702301

STREET ADDRESS:  
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HELSINGBORG  
SWEDENPOSTAL ADDRESS:  
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S-254 52 HELSINGBORG  
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Telex 32407  
Email mail@awapatent.com

Other AWAPATENT offices:

MALMÖ (Head office and registered office)  
STOCKHOLM GÖTEBORG  
SÖDERHAMN VÄXJÖ  
LIDKÖPING VARBERG  
ÖSTERSUND LUND

1998-09-09 14:00 G \PAT\MP\KORRESP\MYND\B2980609.DOC

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P B 5818 - Patentaan 2  
2280 HV Rijswijk (ZH)  
TX 31651 epo nl  
FAX (070) 3 40 30 14

Europäisches  
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Eingangs-  
stelle

European  
Patent Office  
Receiving  
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Office européen  
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Section de  
Dépôt

Giver, Sören Bo  
Awap patent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE

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1998 -07- 02

AWAPATENT, Malmö

Date/Date

29.06.98

Anmeld./Pat./Pat.	Anmeldung Nr./Application No./Demande n°/Patent No./Brevet n°
2980609	98106535.2-2303/0855482
Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire Välinge Aluminium AB	

MITTEILUNG GEMÄSS TEIL A-III, 5.3 DER RICHTLINIEN FÜR DIE PRÜFUNG IM EPA

Die dem nachstehend angegebenen Erfinder gemäss Regel 17(3) EPÜ über-  
sandte Mitteilung kam unzustellbar zurück. Bitte teilen Sie uns die  
richtige Adresse des Erfinders mit (Regel 17(1) EPÜ).

\*\*\*

NOTIFICATION PURSUANT TO PART A-III, 5.3 OF THE GUIDELINES FOR  
EXAMINATION IN THE EPO

The communication issued pursuant to Rule 17(3) EPC, sent to the inven-  
tor designated below, has been returned by the postal services. You are  
requested to indicate the correct address of the inventor (Rule 17(1)).

\*\*\*

NOTIFICATION FAITE EN APPLICATION DE LA PARTIE A-III, 5.3 DES DIRECTIVES  
RELATIVES A L'EXAMEN PRATIQUE A L'OEB

La communication selon la règle 17(3) CBE, transmise à l'inventeur  
désigné ci-après, a été retournée par les services postaux. Vous êtes  
prié d'indiquer l'adresse exacte de l'inventeur (règle 17(1) CBE).

ERFINDER : Pervan, Tony  
INVENTOR : Radjurstigen 32  
INVENTEUR : SE / 17072 Solna

INGANGSSTELLE  
RECEIVING SECTION  
SECTION DE DEPOT

MOORE PERSON



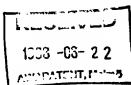
P.B. 5018 - Patentamt  
2200 HV Rijswijk (ZH)  
32 (070) 3 40 20 40  
TX 31851 epo nl  
FAX (070) 3 40 30 16

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Section de  
Dépôt

Giver, Sören Bo  
Awapattent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE



Datum/Date  
17/06/98

Inventor/Erfind.

2980609

Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°.

98106535.2-2303 / 0855482

Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire

Välinge Aluminium AB

# NOTIFICATION OF EUROPEAN PUBLICATION NUMBER AND INFORMATION ON THE APPLICATION OF ARTICLE 67(3) EPC

The Receiving Section hereby informs you that the technical preparations for publication of the above-mentioned European patent application have been completed.

The provisional protection under Art. 67(1) and (2) EPC in the individual Contracting States becomes effective only when the conditions referred to in Art. 67(3) EPC have been fulfilled (for further information, see EPO brochure "National Law relating to the EPC").

This application will be published on 29.07.98 without the European search report. The publication will be mentioned in European Patent Bulletin number 1998/31

The publication number is: 0855482

The title of the invention in the three official languages of the European Patent Office is worded as follows:

Verfahren zum Verlegen und zur mechanischer Verbindung von Bauplatten und Verfahren zur Herstellung eines Fussbodens  
A method for laying and mechanically joining building panels and a method for producing a floor

Procédé de pose et de liaison mécanique des panneaux de construction et procédé de fabrication d'un plancher

In all future communications to the EPO, please quote the application number as indicated above, i.e. including the final four figures (which identify the Directorate responsible for the subsequent procedure).

Amendments to a European patent application or European patent must be filed in the language of the proceedings.

REMARK: An issue of the published European patent application will be forwarded to you directly from our printer.

RECEIVING SECTION



# Empfangsbescheinigung / Receipt for documents / Récépissé de documents 6

(Liste der diesem Antrag beigefügten Unterlagen)

(Checklist of enclosed documents)

(Liste des documents annexés à la présente requête)

Es wird hiermit der Empfang der unten bezeichneten Dokumente bescheinigt / Receipt of the documents indicated below is hereby acknowledged / Nous attestons la réception des documents désignés ci-dessous

Wird im Falle der Einreichung der europäischen Patentanmeldung bei einer nationalen Behörde diese Empfangsbescheinigung vom Europäischen Patentamt überreicht, so ist sie als Mitteilung gemäß Regel 24(4) EPAn zu betrachten (siehe Folie 24(4)). Nach Erhalt der Mitteilung nach Regel 24(4) sind alle weiteren Unterlagen, die die Anmeldung betreffen, nur noch sendefähig beim EPA einzureichen. / If this receipt is issued by the European Patent Office and the European patent application was filed with a national authority it serves as a communication under Rule 24(4) (see Section RENAL). Once the communication under Rule 24(4) has been received, all further documents relating to the application must be sent directly to the European Patent Office. / S. en cas de dépôt de la demande de brevet européen auprès d'un service national, l'Office européen des brevets délivre le présent récépissé de documents, ce récépissé est réputé être la notification visée à la règle 24(4). Dès que la notification visée à la règle 24(4) a été reçue, tous les autres documents relatifs à la demande doivent être adressés directement à l'OEB.

ANAPATENT AB  
Box 5117  
S-200 71 MALMÖ  
Sweden

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Datum / Date



Unterschrift / Signature / Signature / Signature (Please sign)

Anmeldenummer / Application No. / N° de la demande		98106535.2
Tag des Empfangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))	DREC	0 9. 04. 98
Zeichen des Anmelders/Vertraters / Applicant's/ Representative's ref. / Référence du demandeur ou du mandataire	AREF	

Nur nach Einreichung der Anmeldung bei einer nationalen Behörde: / Only after filing of the application with a national authority: / Seulement après le dépôt de la demande auprès d'un service national:

Tag des Empfangs vom EPA (Regel 24(4)) / Date of receipt at: EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA	
---	------	--

A. Ausweisunterlagen und Prioritätsbeleg(e) / Application documents and priority document(s) / Pièces de la demande et document(s) de priorité		47
1. Beschriftung / Description		
2. Patentansprüche / Claims / revendications		
3. Zeichnung(en) / Drawing(s) / Dessin(s)	DRAW 1 #	
4. Zusammenfassung / Abstract / Résumé		
5. Übersetzung der Anmeldeunterlagen / Translation of the application documents / Traduction des pièces de la demande		
6. Prioritätsbeleg(e) / Priority document(s) / Document(s) de priorité		
7. Übersetzung des oben Prioritätsbeleg(s) / Translation of priority document(s) / Traduction du (des) document(s) de priorité		
B. Der Anmeldung in der eingereichten Fassung liegen folgende Unterlagen bei: / The application as filed is accompanied by the items below: / À la présente demande sont annexées les pièces suivantes:		48
1. Einzelvollmacht / Sole's authorization / Pouvoir personnel		
2. Allgemeine Vollmacht / General authorization / Pouvoir général		
3. Erfindenanzeige / Designation of invention / Désignation de l'invention		
4. Früherer Recherchebericht / Earlier search report / Rapport de recherche antérieur		
5. Gültigkeitszeugnis (EPA Form 1012) / Voucher for the settlement of fees (EPO Form 1012) / Recouvrement de règlement de taxes (OEB Form 1012)		
6. Schein ausgestellt bei der Einreichung bei den nationalen Behörden / Checke über die Einreichung bei den nationalen Behörden / Chèque sur la dépôt auprès des services nationaux / Dittor för attestation / Dittor certifier for sequence items / Support de données pour liste de séquences	SEQ 1(4)	
7. Zusatzblatt / Additional sheet / Feuille supplémentaire		
8. Sonstige Unterlagen die hier auszuweisen / Other pieces specify here / Autres documents à spécifier ici		
9. Kopien dieser Empfangsbescheinigung / Copies of this receipt for documents / Copies du présent récépissé de documents		

Stückzahl / Number of copies / Nombre de copies	Stückzahl ohne Dubletts / Number of sheets in each copy / Nombre de feuilles par exemplaire	Gesamtzahl der Abbildungen / Total number of figures / Nombre total de figures
3	19	
3	9	
3	6	13
3	1	

☒ Copy of authorisation filed in the parent application.

☒ Debit Order

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9430,-

Anzahl des Kopien / Number of copies / Nombre de copies

2

Die Reihenfolge der Angabe der Figuren und die Gesamtzahl der Abbildungen wurde bei Eingang nicht geprüft / Its check was made on receipt that the number of pages and the total number of figures indicated were correct / Le nombre de pages et le nombre total de figures n'ont été vérifiés qu'à réception de la demande

EPAn/EOEB Form 1001.6 37/97

2980609

Nach der Zerstörung der Anmeldung / Upon the annulment of the application / Après la destruction de la demande

99-APR. 98 (T02) 14:15 AMAPATENT AB  
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## Hinweis

## Note

## Avis

1. Sie haben eine **europäische oder internationale Patentanmeldung per Telekopie (Telefax)** eingereicht.

Falls die einzureichenden formgerechten schriftlichen Unterlagen der betreffenden Anmeldung nicht entsprechend gekennzeichnet waren, besteht die Gefahr der Doppelanlage von Anmeldungsakten. Dies trifft besonders in den Fällen zu, in denen die Telekopie (Telefax) bei einer anderen Behörde eingereicht worden ist als die formgerechten schriftlichen Unterlagen.

Um unnötigen Verwaltungsaufwand zu vermeiden, wird gebeten, die formgerechten schriftlichen Unterlagen der Anmeldung mit einem **Hinweis\***

- auf die Anmeldenummer oder das Datum der Übermittlung der Telekopie (Telefax) und den Namen der Einreichungsbehörde der Telekopie (Telefax),
- und auf die Tatsache, daß diese Unterlagen eine "Bestätigung einer durch Telekopie (Telefax) eingereichten Anmeldung" darstellen, zu versehen.

Bitte verwenden Sie hierfür künftig die beigefügten Aufkleber.

2. In den Fällen der gleichzeitigen Absendung der Telekopie (Telefax) und der formgerechten schriftlichen Unterlagen einer **europäischen Patentanmeldung** sollen diese Angaben im Formblatt für den Antrag auf Erteilung eines europäischen Patents (EPA Form 1001)\*\* in der eigens hierfür vorgesehenen Rubrik im Kopfteil dieses Vordrucks gemacht werden.

\* Siehe Ziffer 4.1 der Mitteilung des EPA vom 2. Juni 1992, ABl. EPA 1992, 306.

\*\* Siehe Ziffer 3(a) der Mitteilung des EPA über die Neufassung des Formblatts für den Erteilungsantrag sowie Abschnitt I des Merkblatts zu diesem Formblatt, ABl. EPA 1989, 503.

1. You have filed a **European or international patent application by facsimile**.

If this has not been indicated on the hard-copy application documents complying with the rules there is a risk that the application file may be duplicated, particularly where the facsimile and the hard-copy documents have been filed with different authorities.

To avoid unnecessary administrative work, applicants are requested to indicate the following on the hard-copy documents\*:

- the application number or the date of the facsimile and the name of the authority with which it was filed,
- the fact that these documents represent "confirmation of an application filed by facsimile".

Please use the enclosed labels for this purpose in future.

2. In cases where the facsimile and the regulation hard-copy documents relating to a **European patent application** are filed at the same time, this should be indicated in the Request for Grant form for a European patent (EPO Form 1001)\*\* in the section provided for the purpose at the top of the first page of the form.

\* See Point 4.1 of the EPO notice of 2 June 1992, OJ EPO 1992, 306.

\*\* See Point 3(a) of the EPO notice concerning the revised Request for Grant form and Section I of the notes to this form, OJ EPO 1989, 503.

1. Vous avez déposé une demande de brevet **européen ou une demande internationale par télécopie (téléfax)**.

Si les pièces écrites de la demande concernée présentées en bonne et due forme, qui doivent être produites, n'en font pas mention, il existe un risque de double constitution des dossiers de demandes. Cela est particulièrement vrai dans les cas où la télécopie (téléfax) a été déposée auprès d'une autre autorité que celle où sont déposées les pièces écrites présentées en bonne et due forme.

Afin d'éviter tout travail administratif inutile, il y a lieu de joindre aux pièces écrites de la demande présentée en bonne et due forme une **note\***

- indiquant le numéro de dépôt de la demande ou la date d'envoi de la télécopie (téléfax) ainsi que le nom de l'autorité auprès de laquelle la télécopie (téléfax) a été déposée, et
- mentionnant que ces pièces constituent une "confirmation d'une demande déposée par télécopie (téléfax)".

A cet effet, nous vous demandons d'utiliser désormais les autocollants ci-joints.

2. En cas d'envoi simultané de la télécopie (téléfax) et des pièces écrites d'une demande de brevet **européen** présentées en bonne et due forme, il y a lieu de porter ces indications sur le formulaire de requête en délivrance d'un brevet européen (OEB Form 1001)\*\* en ramplissant la rubrique spécialement prévue au début de celui-ci.

\* Cf. point 4.1 du Communiqué de l'OEB en date du 2 juin 1992, JO OEB 1992, 306.

\*\* Cf. point 3(a) du Communiqué de l'OEB concernant le nouveau formulaire de requête en délivrance ainsi que la section I de la notice relative à ce formulaire, JO OEB 1989, 503.

90005744-022/01

# AWAPATENT AB

Handled by  
Sören Giver/MP

RECEIVED

Malmö  
1998-04-09

Our ref.  
2980609

1998-04-23

Attention  
Cash and Accounts Dep.

AWAPATENT, Malmö

RECEIVED

1998-04-24

## DEBIT ORDER

Deposit account No. 2810.0022  
Account holder: AWAPATENT AB  
Filing fee

EUROPEAN PATENT OFFICE

Cash & Accounts Dep.  
DE-80298 MÜNCHEN

AWAPATENT AB

Box 5117  
S-200 71 Malmö/Sweden

SENT BY REGISTERED MAIL

New Divisional Application based on  
European Patent Application No. 94915725.9  
Applicant(s): VÄLINGE ALUMINIUM AB

Please debit our deposit account with the items indicated below

<b>EPC - New application</b>		
Filing fee	<input checked="" type="checkbox"/> 100%	250
Search Fee	<input type="checkbox"/> 80%	1700
Fee for add. claims (> 10)	<input type="checkbox"/> 80	400
Fee for add. copy of ref.		40
<b>Euro-PCT: Regional phase</b>		
National fee		
Search fee	<input type="checkbox"/> 80%	
Fee for add. claims	<input type="checkbox"/> 0%	
Fee for add. copy of ref.	<input type="checkbox"/> 80	
<b>Designation fee</b>	16 x 150	2400
<b>Extension fee</b>	x	
<b>Examination fee</b>	<input type="checkbox"/> 100%	2240
	<input checked="" type="checkbox"/> 80%	
	<input type="checkbox"/> 50%	
	<input type="checkbox"/> 40%	
<b>Grant fee</b>		
<b>Printing fee</b>		
<b>Others: Annuity fees year 3-5</b> (Year 3=750 DM, 4=800 DM, 5=850 DM)		2400
<b>Total (DEM)</b>		9430

AWAPATENT AB

Please return the enclosed  
acknowledgement copy

Sören Giver

MALMO (Head Office and registered office)

Senast uppdaterad: 1998-04-09

STREET ADDRESS:  
Bellevuevägen 46  
Malmö  
SWEDEN

POSTAL ADDRESS:  
Box 5117  
S-200 71 MALMO  
SWEDEN

Telephone +46 40 98 51 00  
Fax +46 40 26 05 16  
Telex 32407  
VAT No. SE55082702301

LUND VÄXJÖ SÖDERHAMN  
HELSINGBORG GÖTEBORG  
VARBERG STOCKHOLM



# Antrag auf Erteilung eines europäischen Patents / Request for grant of a European patent / Requête en délivrance d'un brevet européen

Bestätigung einer bereits durch Telekopie (Telex) eingereichten Anmeldung / Confirmation of an application already filed by facsimile / Confirmation d'une demande déjà déposée par télécopie  
Wenn a. Datum der Übermittlung der Telekopie und Name der Erreichungsbehörde / If yes, facsimile data and name of the authority with which the documents were filed / Si oui, date d'envoi de la télécopie et nom de l'autorité de dépôt

☐ Ja / Yes / Oui

Datum / Date Behörde / Authority / Autorité

980409 EPO

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Anmeldenummer / Application No. / N° de la demande	MKEY	1
Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))	DREC	2
Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA	3
Anmeldetag / Date of filing / Date de dépôt		4

Tabulatoren-Positionen / Tabulation marks / Arrêts de tabulation

Es wird die Erteilung eines europäischen Patents und gemäß Artikel 94 die Prüfung der Anmeldung beantragt / Grant of a European patent, and examination of the application under Article 94, are hereby requested / Il est demandé la délivrance d'un brevet européen et, conformément à l'article 94, l'examen de la demande

EXAM 4

5 ☒ Prüfungsantrag in einer zugelassenen Nichtamtssprache (siehe Merkblatt II, 5) / Request for examination in an admissible non-EPO language (see Notes II, 5) / Requête en examen dans une langue non officielle autorisée (voir notice II, 5): Hämed begärs patenterbarhetsprövning.

Zeichen des Anmelders oder Vertreters (max. 15 Positionen) / Applicant's or representative's reference (maximum 15 spaces) / Référence du demandeur ou du mandataire (max. 15 caractères ou espaces)

AREF

6 2980609

ANMELDER / APPLICANT / DEMANDEUR  
Name / Nom

Anschrift / Address / Adresse

APPR 01 #

# DEST #

7 VÄLINGE ALUMINIUM AB

8 Kyrkogård 1  
S-260 40 VIKEN  
Sweden

Zustellenschrift / Address for correspondence / Adresse pour la correspondance

PADR

Staat des Wohnsitzes oder Sitzes / State of residence or of principal place of business / Etat du domicile ou du siège

Staatsangehörigkeit / Nationality / Nationalité

10 Sweden

11 Sweden

Telefon / Telephones / Téléphone

Telefax / Télex

Telefax / Fax / Téléfax

Weiterer/Anmelder auf Zusatzblatt / Additional applicant on additional sheet / Autre(s) demandeur(s) sur feuille additionnelle

VERTRETER / REPRESENTATIVE / MANDATAIRE:  
Name / Nom

Nur einen Vertreter angeben, der in das europäische Patentregister eingetragen und an den zugestellt wird / Name only one representative, who is to be listed in the Register of European Patents and to whom notification is to be made / N'indiquer qu'un seul mandataire, qui sera inscrit au registre européen des brevets et auquel signification sera faite

FREP 01

15 GIVER, Sören

Geschäftsschrift / Address of place of business / Adresse professionnelle

16 AWAPATENT AB  
Box 5117  
S-200 71 MALMÖ  
Sweden

Telefon / Telephones / Téléphone

Telefax / Télex

Telefax / Fax / Téléfax

Weiterer/Vertreter auf Zusatzblatt / Additional representative on additional sheet / Autre(s) mandataire(s) sur feuille additionnelle

17 +46 40 98 51 00

18 32407

+46 40 26 05 16

EPA/EPO/OEB Form 1001.1 07.97

TRAN

FLL

2980609

Form für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur



Vollmacht / Authorisation / Pouvoir: Ist beigelegt / Is enclosed / ci-joint		20	<input type="checkbox"/>
Ist registriert unter Nummer / has been registered under No. / a été enregistré sous le n°		21	GENA Nummer Numéro
ERFINDER / INVENTOR / INVENTEUR: Anmelder ist (sind) alleinige(r) Erfinder / The applicant(s) is (are) the sole inventor(s) / Le(a) demandeur(a) est (sont) le (les) seul(s) inventeur(s)		22	<input type="checkbox"/>
Erfindernennung auf gesondertem Schriftstück / Designation of inventor attached / Voir la désignation de l'inventeur ci-jointe		23	<input checked="" type="checkbox"/>
BEZEICHNUNG DER ERFINDUNG / TITLE OF INVENTION / TITRE DE L'INVENTION: TIDE TIEN TIFR		24	A METHOD FOR LAYING AND MECHANICALLY JOINING BUILDING PANELS AND A METHOD FOR PRODUCING A FLOOR
PRIORITÄTserklärung / DECLARATION OF PRIORITY / DÉCLARATION DE PRIORITÉ: 01 # # # # # 02 # # # # # 03 # # # # # 04 # # # # # Weitere Prioritätserklärung(en) auf Zusatzblatt / Additional declaration(s) of priority on additional sheet / Autre(s) déclaration(s) de priorité sur feuille additionnelle		25	Staat / State / Etat Anmeldezeit / Filing date / Date de dépôt Aktenzeichen / Application No. / N° de la demande 1 Sweden 93-05-10 9301595-6 2 3 4
BIOLOGISCHES MATERIAL Die Erfindung betrifft biologisches Material oder seine Verwendung, das nach Regel 28 hinterlegt worden ist.		26	MATIERE BIOLOGIQUE L'invention concerne et/ou utilise la matière biologique, déposée conformément à la règle 28.
BIOLOGICAL MATERIAL The invention relates to and/or uses biological material deposited under Rule 28. BIOM 1 # # # # #		27	Seite(n) / page(s) Zeile(n) / line(s) / ligne(s)
Die Angaben nach Regel 28(1) c) sind in den technischen Anmeldeunterlagen enthalten auf / The particulars referred to in Rule 28(1) (c) are given in the technical documents in the application on / Les indications visées à la règle 28(1) ci figurent dans les pièces techniques de la demande à la / aux werden später mitgeteilt / will be submitted later / seront communiquées ultérieurement Die Empfangsbescheinigung(en) der Hinterlegungsstelle ist (sind) beigelegt / The receipt(s) of deposit issued by the depositary institution is (are) enclosed / Le(s) récépissé(s) de dépôt délivré(s) par l'autorité de dépôt est (sont) ci-jointe(s) wird (werden) nachgereicht / will be filed later / sera (seront) produit(s) ultérieurement		27a	<input type="checkbox"/>
Verzicht auf die Verpflichtung des Antragstellers nach Regel 28(3) auf gesondertem Schriftstück / Waiver of the right to an undertaking from the requester pursuant to Rule 28(3) attached / Renonciation, sur document distinct, à l'engagement du requérant au titre de la règle 28(3)		28	<input type="checkbox"/>
		28a	<input type="checkbox"/>
		29	<input type="checkbox"/>

2980609

Falls das biologische Material nicht vom Anmelder, sondern von einem Dritten hinterlegt wurde: / Where the biological material has been deposited by a person other than the applicant: / Lorsque le matériel biologique a été déposé par une personne autre que le demandeur:

Ermächtigung nach Regel 28(1)(d) / Authorisation under Rule 28(1)(d) / Autorisation en vertu de la règle 28(1)(d)

Ist beigelegt / Is enclosed / ci-joint

Wird nachgereicht / Will be filed later / sera produit ultérieurement

NUCLEOTID-UND AMINOSÄURESEQUENZEN / NUCLEOTIDE AND AMINO ACID SEQUENCES / SEQUENCES DE NUCLEOTIDES ET D'ACIDES AMINES

SEQ(1)

Die Beschreibung enthält ein Sequenzprotokoll nach Regel 27a(1) / The description contains a sequence listing in accordance with Rule 27a(1) / La description contient une liste de séquences selon la règle 27a(1)

Der vorgeschriebene maschinenlesbare Datenträger ist beigelegt / The prescribed machine readable data carrier is enclosed / Le support de données prescrite déchargeable par machine est annexé

Es wird hiermit erklärt, daß die auf dem Datenträger gespeicherte Information mit dem schriftlichen Sequenzprotokoll übereinstimmt (Regel 27a(2)) / It is hereby stated that the information recorded on the data carrier is identical to the written sequence listing (Rule 27a(2)) / Il est déclaré par la présente que l'information figurant sur le support de données est identique à celle qui contient la liste de séquences écrite (règle 27a(2))

BENENNUNG DER VERTRAGSSTÄATEN UND ERKLÄRUNGEN HIERZU

DESIGNATION OF THE CONTRACTING STATES AND ASSOCIATED DECLARATIONS

1. Hiermit werden sämtliche Vertragsstaaten des EPU benannt, die bei Einreichung dieser Anmeldung dem EPU angeschlossen sind.

1. All States which are Contracting States to the EPC at the filing of this application are hereby designated.

2. Der Anmelder beabsichtigt derzeit, Benennungsgesuchen für die nachfolgend angekreuzten Vertragsstaaten zu entrichten:

2. The applicant currently intends to pay designation fees for the States marked below with a cross:

DEST

- ☒ AT Österreich / Austria / Autriche
- ☒ BE Belgien / Belgium / Belgique
- ☒ CH/LI Schweiz und Liechtenstein / Switzerland and Liechtenstein / Suisse et Liechtenstein
- ☒ DE Deutschland / Germany / Allemagne
- ☒ DK Dänemark / Denmark / Danemark
- ☒ ES Spanien / Spain / Espagne
- ☐ FI Finnland / Finland / Finlande
- ☒ FR Frankreich / France / France
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

Platz für Vertragsstaaten, für die das EPU nach Drucklegung dieses Formblatts in Kraft tritt / Space for Contracting States for which the EPC enters into force after the form has been printed / Place pour les États contractants à l'égard desquels le CBE entrera en vigueur après l'impression du présent formulaire

Es wird beantragt, für die unter Nr. 2 nicht angekreuzten Vertragsstaaten von der Zustellung von Mitteilungen nach Regel 89a(1) und Regel 89(1) abzusehen.

Ist ein automatischer Abbuchungserhalt erteilt worden (Pfad 43), so wird beantragt, das Ablauf der Grundfrist nach Artikel 79(2) Benennungsgesuchen nur für die unter Nr. 2 angekreuzten Vertragsstaaten abzusehen.

It is requested that no communications under Rule 89a(1) and Rule 89(1) be notified concerning the Contracting States not marked with a cross under No. 2. If an automatic debit order has been given (section 43), it is requested that, when the basic period specified in Art. 79(2) expires, designation fees be debited only for the Contracting States marked with a cross under No. 2.

30 Name und Anschrift des Hinterlegers / Name and address of depositor / Nom et adresse du déposant:

30a ☐

30b ☐

31 ☐

☐

☐

☐

☐

32 ☒

DESIGNATION D'ÉTATS CONTRACTANTS ET DÉCLARATIONS À CE PROPOS

1. Sont désignés tous les États qui sont des États contractants de la CBE à la date du dépôt de la présente demande.

2. Le demandeur se propose actuellement de payer des taxes de désignation pour les États cochés ci-dessous:

- ☒ GB Vereinigtes Königreich / United Kingdom / Royaume-Uni
- ☒ GR Griechenland / Greece / Grèce
- ☒ IE Irland / Ireland / Irlande
- ☒ IT Italien / Italy / Italie
- ☒ LU Luxemburg / Luxembourg / Luxembourg
- ☒ MC Monaco / Monaco / Monaco
- ☒ NL Niederlande / Netherlands / Pays-Bas
- ☒ PT Portugal / Portugal / Portugal
- ☒ SE Schweden / Sweden / Suède
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

Platz für Vertragsstaaten, für die das EPU nach Drucklegung dieses Formblatts in Kraft tritt / Space for Contracting States for which the EPC enters into force after the form has been printed / Place pour les États contractants à l'égard desquels le CBE entrera en vigueur après l'impression du présent formulaire

☒ Prière de ne pas procéder à la signification des notifications prévues par les règles 89a(1) et 89(1) pour les États contractants n'ayant pas été cochés au n. 2.

Si un ordre de prélèvement automatique a été donné (rubrique 43), prière de ne procéder à l'expiration des délais de base tels que définis à l'article 79(2) que les taxes de désignation pour les États contractants cochés au n. 2.

Verchiedene Anmelder für verschiedene Vertragsstaaten /  
Different applicants for different Contracting States /  
Différents demandeurs pour différents Etats contractants

APPR 02 #

# ERSTRECKUNG DES EUROPÄISCHEN PATENTS

Diese Anmeldung gilt als Antrag, die europäische Patentanmeldung und des darauf erteilte europäische Patent auf alle Nicht-Vertragsstaaten des EPU zu erstrecken, mit denen am Tag ihrer Einreichung „Erstreckungsabkommen“ bestehen (Dänemark, Albanien, Litauen, Lettland, Rumänien, Slowenien). Die Erstreckung wird jedoch nur wirksam, wenn die vorgeschriebene Erstreckungsgebühr entrichtet wird.

# EXTENSION OF THE EUROPEAN PATENT

This application is deemed to be a request to extend the European patent application and the European patent granted in respect of it to all non-Contracting States to the EPC with which "extension agreements" exist on the date on which the application is filed (Present situation: Albania, Lithuania, Latvia, Romania, Slovenia). However, the extension only takes effect if the prescribed extension fee is paid.

EXPT

Der Anmelder beabsichtigt derzeit, die Erstreckungsgebühr für die nachfolgend angegebenen Staaten zu entrichten: / The applicant currently intends to pay the extension fee for the States marked below with a cross: / Le demandeur se propose actuellement d'acquitter la taxe d'extension pour les Etats dont le nom est coché ci-après:

Albanien / Albania / Albanie

AL

Litauen / Lithuania / Lituanie

LT

Lettland / Latvia / Lettonie

LV

Rumänien / Romania / Roumanie

RO

Slowenien / Slovenia / Slovénie

SI

(Platz für Staaten, mit denen nach Drucklegung dieses Formblatts „Erstreckungsabkommen“ in Kraft treten) /  
Space for States with which "extension agreements" enter into force after the form has been printed /  
(Espace pour des Etats à l'égard desquels des accords d'extension entreraient en vigueur après l'impression du présent formulaire)

Die Anmeldung ist eine Teilanmeldung /  
The application is a divisional application /  
La présente demande constitue une demande divisionnaire

DFIL 9

PANR

Es handelt sich um eine Anmeldung nach Art. 61(1)(b) /  
The application is an Art. 61(1)(b) application /  
La présente demande constitue une demande selon l'article 61(1)(b)

DFIL 9

EANR

Patentansprüche / Claims / Revendications

CLMS

Zur Veröffentlichung mit der Zusammenfassung wird vorgeschlagen  
Abbildung Nr. / With the abstract it is proposed to publish  
figure No. / Il est proposé de publier avec l'abstrait  
la figure n°

DRAW (2)

33 Name(n) des (der) Anmelder(s) und benannte Vertragsstaaten /  
Name(s) of applicant(s) and designated Contracting States /  
Nom(s) du (des) demandeur(s) et des Etats contractants désignés

# 34 EXTENSION DES EFFETS DU BREVET EUROPEEN

La présente demande est réputée constituer une requête en extension des effets de la demande de brevet européen et du brevet européen délivré sur la base de cette demande à tous les Etats non parties à la CSE avec lesquels il existe un "accord d'extension" à la date du dépôt de la demande (Situation actuelle: Albanie, Lituanie, Lettonie, Roumanie, Slovénie). Toutefois l'extension ne produit ses effets que s'il est acquitté la taxe d'extension prescrite.

35 x 94915725.9 Nummer der früheren Anmeldung  
No. of earlier application  
Numéro de la demande initiale

36 15 Nummer der früheren Anmeldung  
No. of earlier application  
Numéro de la demande initiale

37 15 Zahl der Patentansprüche  
Number of claims  
Nombre de revendications

39 2a-2c Nummer / Number / Numéro

2980609

Platz für Zeichen des Anmelders / Space for applicant's  
reference / Espace réservé à la référence du demandeur

2980609  
Raum für Zeichen des Anmelders / Space for applicant's  
reference / Espace réservé à la référence du demandeur

# Empfangsbescheinigung / Receipt for documents / Récépissé de documents 6

(Liste der diesem Antrag beigelegten Unterlagen)

(Checklist of enclosed documents)

(Liste des documents annexés à la présente requête)

Es wird hiermit der Empfang der unten bezeichneten Dokumente bescheinigt / Receipt of the documents indicated below is hereby acknowledged / Nous attestons le dépôt des documents désignés ci-dessous

Wird im Falle der Einreichung der europäischen Patentanmeldung bei einer nationalen Behörde diese Empfangsbescheinigung vom Europäischen Patentamt übersandt, so ist sie als Mitteilung gemäß Regel 24(4) anzusehen (siehe Feld RENA). Nach Erhalt der Mitteilung nach Regel 24(4) sind alle weiteren Unterlagen, die die Anmeldung betreffen, nur noch unmittelbar beim EPA einzuzeichnen. / If this receipt is issued by the European Patent Office and the European patent application was filed with a national authority it serves as a communication under Rule 24(4) (see Section RENA). Once the communication under Rule 24(4) has been received, all further documents relating to the application must be sent directly to the European Patent Office. / Si, en cas de dépôt de la demande de brevet européen auprès d'un service national, l'Office européen des brevets délivre le présent récépissé de documents, ce récépissé est réputé être la notification visée à la règle 24(4). Dès que la notification visée à la règle 24(4) a été reçue, tous les autres documents relatifs à la demande doivent être adressés directement à l'OEB.

AWAPATENT AB  
Box 5117  
S-200 71 MALMÖ  
Sweden

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Datum / Date

Unterschrift / Amtsstempel / Signature / Official stamp / Signature / Cachet officiel

Anmeldenummer / Application No. / N° de la demande

Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))

DREC

Zeichen des Anmelders/Vertreters / Applicant's / Representative's ref. / Référence du demandeur ou du mandataire

AREF

Nur nach Einreichung der Anmeldung bei einer nationalen Behörde: / Only after filing of the application with a national authority: / Seulement après le dépôt de la demande auprès d'un service national:

Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))

RENA

A. Anmeldungsunterlagen und Prioritätsbelege / Application documents and priority documents / Pièces de la demande et documents de priorité

47

Stückzahl / Number of copies / Nombre d'exemplaires

Blattzahl\* eines Stücks / Number of sheets\* in each copy / Nombre de feuilles\* par exemplaire

Gesamtzahl der Abbildungen\* / Total number of figures\* / Nombre total de figures\*

1. Beschreibung / Description

3

19

2. Patentansprüche / Claims / Revendications

3

9

3. Zeichnungen / Drawings / Dessins

DRAW 1 #

3

6

13

4. Zusammenfassung / Abstract / Résumé

3

1

5. Übersetzung der Anmeldungsunterlagen / Translation of the application documents / Traduction des pièces de la demande

6. Prioritätsbelege / Priority documents / Documents de priorité

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A METHOD FOR LAYING AND MECHANICALLY JOINING BUILDING  
PANELS AND A METHOD FOR PRODUCING A FLOOR

Technical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

- 5 More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one panel.

- The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

25 Background of the Invention

- A joint of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and grooves. The locking device for the second mechanical  
30 connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-

apart spring clips which are distributed along the joint and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful  
 5 for joining thick floor panels to form surfaces of a considerable expanse.

Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels  
 10 employed are laid as "floating floors" without being attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in  
 15 the groove and forcing the floor panels together. The tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board,  
 20 and a base layer to balance the construction. The core has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall  
 25 thickness must be at least about 7 mm. These known laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier  
 30 to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

35 Second, the core must be made of moisture-absorbent material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the



floors thinner using so-called compact laminate, because of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

Third, since the laminate layer of the laminated  
5 floors is highly wear-resistant, tool wear is a major problem when working the surface in connection with the formation of the tongue.

Fourth, the strength of the joint, based on a glued  
10 tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in  
15 air humidity.

Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to every panel on both the long and short sides thereof.

Sixth, it is not possible to disassemble a glued  
20 floor once laid, without having to break up the joints. Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out  
25 panels be replaced without extensive efforts, which would be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

Seventh, known laminated floors are not suited for  
30 such use as involves a considerable risk of moisture penetrating down into the moisture-sensitive core.

Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam  
35 or the like, which is to damp impact sounds and to make the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

must be placed in edge-to-edge fashion. Different underlays affect the properties of the floor.

There is thus a strongly-felt need to overcome the above-mentioned drawbacks of the prior art. It is however  
 5 not possible simply to use the known joining technique with glued tongues and grooves for very thin floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for  
 10 such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of  
 15 about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint  
 20 will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent  
 25 adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is no viable alternative either. Especially, biased clips of this type  
 30 cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers  
 35 from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in con-

nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

- A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

A particular object of the invention is to provide a panel-joining system which

- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
- can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
- makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- reduces tool wear when manufacturing floor panels with hard surface layers;

- These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

15        the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

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that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and

5 is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

10 that the second mechanical connection is so conceived as to allow the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip.

The term "rear side" as used above should be considered to comprise any side of the panel located behind/ underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion of the joint edge.

25 It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can counteract or prevent such displacement and/or upward angling.

The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-

5 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-

assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking

10 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a system is provided which permits precise joining of thin floor panels having, for example, a thickness of the order of 3 mm and which at the same time

15 provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip panel and which exhibits an exact, predetermined distance from its bottom to the front side of the strip panel. The

20 part of the strip projecting behind the groove panel engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance from its bottom to the front side of the groove panel.

25 The thickness of the strip then is at least so great that the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This

30 levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material

35 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an alu-

minium strip, sufficient strength can be achieved with a strip thickness of the order of 0.5 mm.

In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of the invention is characterised in that when the groove panel is pressed against the strip panel in the second direction and is turned angularly away from the strip, the maximum distance between the axis of rotation of the groove panel and the locking surface of the locking groove closest to the joint edges is such that the locking element can leave the locking groove without contacting the locking surface of the locking groove. Such a disassembly can be achieved even if the aforementioned play between the locking groove and the locking surface is not greater than 0.2 mm.

According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

For optimal function of the invention, the strip and the locking element should be formed on the strip panel with high precision. Especially, the locking surface of the locking element should be located at an exact distance from the joint edge of the strip panel.

Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

By known manufacturing methods, it is possible to produce a strip with a locking pin, for example by extruding aluminium or plastics into a suitable section, which is thereafter glued to the floor panel or is inserted in special grooves. These and all other tradi-

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tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the strip panel.

5 The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal  
10 plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

METHOD  
ANGLE

15 Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying  
20 technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently  
25 joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

Strip  
groove

30 In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

Underlay

35 The above and other features and advantages of the invention will appear from the appended claims and the following description of embodiments of the invention.

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The invention will now be described in more detail hereinafter with reference to the accompanying drawing Figures.

#### Description of Drawing Figures

5 Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

10 Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

15 Figs 4a and 4b show a floor panel according to Figs 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

20 Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

#### Description of Preferred Embodiments

25 Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1 having

30

a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has

a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action. *PLAY*

As appears from Figs 4a and 4b, each panel in the system has a strip 6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

nection can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be  
 5 locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

The strip 6 is mounted in a tolerance-equalising groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will  
 15 always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel 2 has a corresponding tolerance-equalising surface or  
 20 groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the strip 6 is so chosen that the underside 44 of the strip  
 25 is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently transmitted to the subfloor 12 without any stresses being  
 30 exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels.  
 35 Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.

*equalising groove*

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Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24.

10 The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising

15 distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail

20 from below in the perspective view of Fig. 6.

Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the

25 underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.

The embodiment of Figs 2a-c is further characterised in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2 towards the subfloor 12 (Fig. 2b), as well as a portion 36

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which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint edges 3, 4 have been brought into complete engagement

with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip panel 1, the projecting part of the strip 6 thus forming

an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of pan-



els in all four directions with respect to the initial position.

( 90005744-022-01 )  
( 10/220" 44/50006 )

## CLAIMS

1. A method for laying and mechanically joining rectangular building panels in parallel rows, especially floor panels, said panels being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised in that each panel, at a rear side thereof, being provided with (i) a locking strip at one long edge and at one short edge, each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part of the joint edge and extending throughout substantially the entire length of the corresponding edge and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel; and in that said method includes the following two main locking steps S1 and S2 for laying a new panel:
- S1: mechanically connecting a long edge of the new panel to a long edge of a previously laid first panel in a first row in such a way that the new panel and the first panel, as a result of said first main locking step S1, are mechanically locked to each other in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the locked long edges, wherein said first main locking step S1 to this end includes the substep of placing the new panel in a second row adjacent to said first row with the long edge of the new panel provided with a locking groove being placed upon and in contact with a locking strip at the adjacent long edge of the first panel, while holding the new panel at an angle relative to a principal

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plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and the substep of subsequently angling down the new panel so as to accommodate the locking element of said strip of the first panel in said locking groove of the new panel, and,

S2: mechanically connecting a short edge of the new panel to a short edge of said previously laid second panel in the second row in such a way that the new panel and the second panel, as a result of said second main locking step, are mechanically locked to each other at said short edges in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the short edges, wherein said second main locking step S2 is performed by a linear displacement of the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of the strip at one of the short edges is received in the locking groove at the other one of the short edges, whereby the new panel, in its final laid position, is mechanically connected in two direction (D1, D2) at its long edge to the first panel and at its short edge to the second panel.

2. A method for laying and mechanically joining rectangular building panels in parallel rows, especially floor panels, said panels being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised in that each panel, at a rear side thereof, being provided with (i) a locking strip at one long edge and at one short edge, each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part

of the joint edge and extending throughout substantially the entire length of the corresponding edge and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel; and in that said method includes the following two main locking steps S1 and S2 for laying a new panel:

- 10 S1: mechanically connecting a long edge of the new panel to a long edge of a previously laid first panel in a first row in such a way that the new panel and the first panel, as a result of said first main locking step S1, are mechanically locked to each other in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the locked long edges, wherein said first main locking step S1 to this end includes the substep of placing the new panel in a second row adjacent to said first row with the locking strip being provided at a long edge of the new panel being inserted under the adjacent long edge of the first panel being provided with a locking groove, while holding the new panel at an angle relative to a principal plane of the first panel and at a distance from its final longitudinal position relative to a previously laid second panel in said second row, and the substep of subsequently angling down the new panel so as to accommodate the locking element of said strip of the new panel in said locking groove of the first panel,

and,

- S2: mechanically connecting a short edge of the new panel to a short edge of said previously laid second panel in the second row in such a way that the new panel and the second panel, as a result of said second main locking step, are mechanically locked to each other

at said short edges in said first direction (D1) as well as in a second direction (D2) parallel to said principal plane and at right angles to the short edges, wherein said second main locking step S2 is performed by a linear displacement of the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of the strip at one of the short edges is received in the locking groove at the other one of the short edges, whereby the new panel, in its final laid position, is mechanically connected in two direction (D1, D2) at its long edge to the first panel and at its short edge to the second panel.

3. A method as claimed in claim 1 or 2, wherein, as a result of said linear displacement of the new panel, the locking strip located at the short edges to be locked together is bent downwards until the locking element snaps up into the locking groove.

4. A method for producing a floor as claimed in any one of claims 1-3, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking groove for engagement with a locking element of the second panel.

5. A method as claimed in claim 4, wherein the new panel is angled down into a position where the end portion of the new panel facing the second panel is placed upon and in contact with the locking strip at the short edge of the second panel.

6. A method as claimed in any one of claims 1-3, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking strip with a locking element for engagement with a locking groove of the second panel.

7. A method as claimed in any one of claims 1-6, wherein said substep of angling down the new panel is performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

8. A method according to any one of claims 1-7, wherein the new panel, after having been laid and mechanically joined to the first and to the second panel, can be taken up by angling the new panel and the second panel together upwards in relation to the first panel and subsequently loosening the new panel from the second panel by angling and/or linear displacing the new panel in relation to the second panel.

9. A method as claimed in claim 8, wherein said step of angling the new panel and the second panel together in relation to the first panel can be performed while holding an upper corner part of the long edge of the new panel in contact with an upper corner part of the long edge of the first panel.

10. A method for producing a floor, comprising the step of manufacturing a plurality of rectangular floor panels provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised by the step of providing each panel, during the manufacturing and at the rear side of the panel, with (i) a locking strip at one long edge and at one short edge, each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part of the joint edge and extending throughout substantially the entire length of the corresponding edge and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an

opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel,

wherein said integrated strips, said grooves and  
5 said locking elements are provided in such a way during the manufacturing that:

- (i) when two adjacent panels have been mechanically joined together along adjacent edges thereof, a strip of one of the panels projects on the rear side of the other  
10 panel with the locking element of said strip being received in a locking groove of the other panel, thereby locking the two panels to each other also in a second direction (D2) parallel to said principal plane and at right angles to the joined edges; and
- 15 (ii) the following laying steps 1-3 can be performed for producing the floor when a new panel is laid and mechanically connected to a long edge of a previously laid first panel in a first row as well as to a short edge of a previously laid second panel in an adjacent second row, said  
20 first and second panels being already mechanically connected to each other at adjacent long edges thereof:
1. placing the new panel in the second row, while holding the new panel at an angle relative to a principal plane of the first panel, such that the new panel is  
25 spaced from its final longitudinal position relative to said second panel and such that the long edge of the new panel provided with a locking groove is placed upon and in contact with a locking strip at the adjacent long edge of the first panel,
  - 30 2. subsequently angling down the new panel so as to accommodate the locking element of said strip of the first panel in said locking groove of the new panel, whereby the new panel and the first panel are mechanically connected with each other in said second  
35 direction (D2) with respect to the thus-connected long edges, wherein said long edges, in the thus angled-down position of the new panel, being in engage-

ment with each other and thereby mechanically locked together in said first direction (D1) also, and finally

3. displacing the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of one of the short edges snaps up into the locking groove of the other one of the short edges, whereby the new panel and the second panel are mechanically connected with each other in both in said first direction (D1) and in said second direction (D2) with respect to the thus-connected short edges.

11. A method for producing a floor, comprising the step of manufacturing a plurality of rectangular floor panels provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, characterised by the step of providing each panel, during the manufacturing and at the rear side of the panel, with (i) a locking strip at one long edge and at one short edge, each locking strip being integrated with the panel as a separate element connected to the panel or as an extension of a lower part of the joint edge and extending throughout substantially the entire length of the corresponding edge and being provided with a projecting locking element, and (ii) a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel,

- wherein said integrated strips, said grooves and said locking elements are provided during the manufacturing in such a way that:
- (i) when two adjacent panels have been mechanically joined together along adjacent edges thereof, a strip of one of the panels projects on the rear side of the other



panel with the locking element of said strip being received in a locking groove of the other panel, thereby locking the two panels to each other also in a second direction (D2) parallel to said principal plane and at

5 right angles to the joined edges; and

(ii) the following laying steps 1-3 can be performed for producing the floor when a new panel is laid and mechanically connected to a long edge of a previously laid first panel in a first row as well as to a short edge of a previously laid second panel in an adjacent second row, said  
10 first and second panels being already mechanically connected to each other at adjacent long edges thereof:

1. placing the new panel in the second row, while holding the new panel at an angle relative to a principal  
15 plane of the first panel, such that the new panel is spaced from its final longitudinal position relative to said second panel and such that a locking strip provided at a long edge of the new panel is inserted under the adjacent long edge of the first panel being  
20 provided with a locking groove,
2. subsequently angling down the new panel so as to accommodate the locking element of said strip of the new panel in said locking groove of the first panel, whereby the new panel and the first panel are mechanically connected with each other in said second  
25 direction (D2) with respect to the thus-connected long edges, wherein said long edges, in the thus angled-down position of the new panel, being in engagement with each other and thereby mechanically locked together in said first direction (D1) also, and finally
3. displacing the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of  
30 one of the short edges snaps up into the locking groove of the other one of the short edges, whereby  
35 the new panel and the second panel are mechanically

connected with each other in both in said first direction (D1) and in said second direction (D2) with respect to the thus-connected short edges.

5        12. A method for producing a floor as claimed in claim 10 or 11, wherein the locking strip located at the short edges to be locked together is provided in such a way that it is bent downwards as a result of displacing the new panel, until the locking element snaps up into  
10       the locking groove.

13. A method for producing a floor as claimed in any one of claim 10-12, wherein the short edge of the new panel to be locked to the short edge of the second panel  
15       presents a locking groove for engagement with a locking element of the second panel.

14. A method for producing a floor as claimed in claim 13, wherein the new panel is angled down into a  
20       position where the end portion of the new panel facing the second panel is placed upon and in contact with the locking strip at the short edge of the second panel.

15. A method for producing a floor as claimed in any one of claims 10-12, wherein the short edge of the new  
25       panel to be locked to the short edge of the second panel presents a locking strip with a locking element for engagement with a locking groove of the second panel.

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Fig. 2a

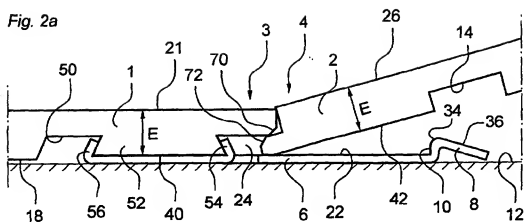


Fig. 2b

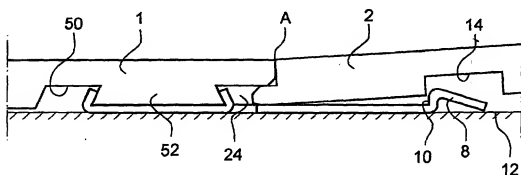


Fig. 2c

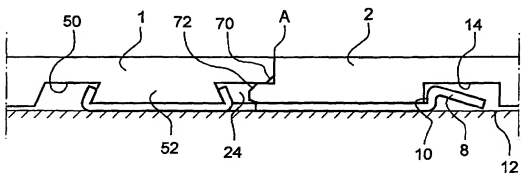


Fig. 3a

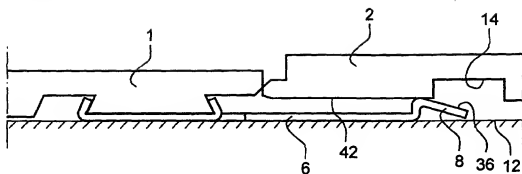


Fig. 3b

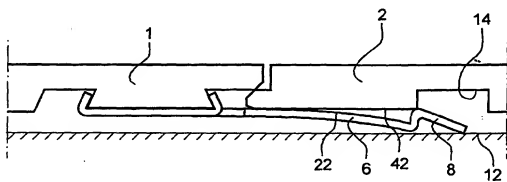


Fig. 3c

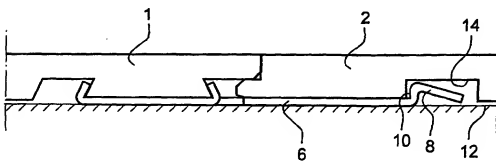


Fig. 4a

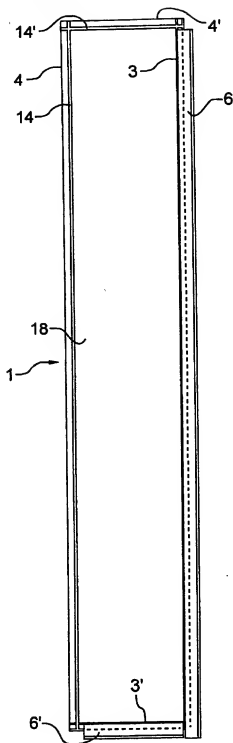


Fig. 4b

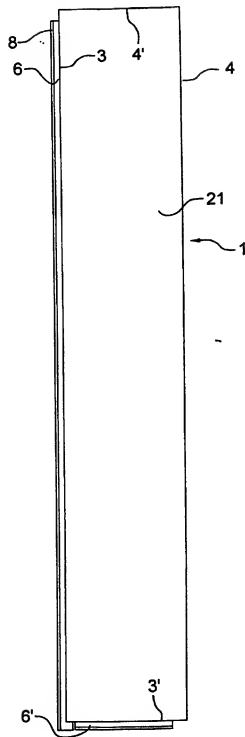


Fig. 5

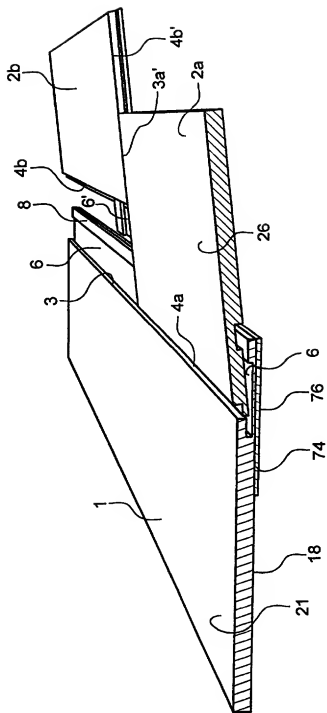




Fig. 6

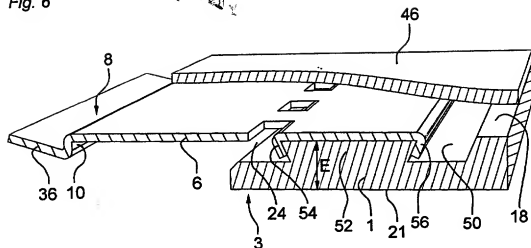
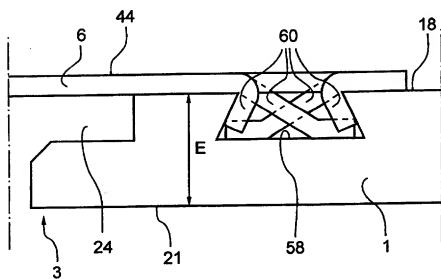


Fig. 7





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Anmeldung Nr./Application No./Demande n°/Patent Nr.No./Brevet n°

94915725.9- -PCT/SE9400386

Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire

VÄLINGE ALUMINIUM AB

1. European patent application No. 94915725.9 has been allotted to the above-mentioned international patent application.
2. FOR ENTRY INTO THE REGIONAL PHASE BEFORE THE EPO the following procedural steps must be taken:
  - 2.1 Within 21 months from the date of filing or (where applicable) from the earliest priority date if the EPO acts as DESIGNATED OFFICE pursuant to Article 22 PCT:
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    - b) Payment of the national basic fee, the designation fee for each State designated, (where applicable) the claims fees for the eleventh and each subsequent claim and the search fee where a supplementary European search report has to be drawn up (Rule 104b(1)(b), (c) EPC).
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    - d) Payment of the renewal fee for the third year, if due before

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the expiration of the 31 month term (Rule 104b(1)(e) EPC).

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4. If the translation of the international application in an official EPO language is not filed in due time, the international application before the EPO is deemed to be withdrawn (Art. 24(1)(iii), Art. 39(2) PCT).
5. The international search report under Article 18 PCT (or the declaration under Article 17(2) a) PCT) was published on 24.11.94.  
This publication takes the place of the mention of the publication of the European search report (Article 157(1) EPC).

A request for examination, comprising a written request and payment of the examination fee, must be filed up to the end of six months after the above date. However, in view of Article 22 or 39 PCT in conjunction with Rule 104b(1)(d) EPC, the period for filing the request for examination does not expire before 21 or 31 months respectively from the date of filing (where applicable, the earliest priority date).

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90005744-02/94

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9. For further details see the Supplement No. 1 to Official Journal No. 12/1992 (Information for PCT applicants concerning time limits and procedural steps before the EPO as a designated and as an elected Office under the PCT (as at 01 January 1993)).

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"EURO-PCT; REGIONAL PHASE"

Procedural steps according to Art. 39 PCT, Art. 156 EPC  
European Application No. 94915725.9  
International Application (IA-PCT) No. PCT/SE94/00386  
Applicant(s): VÄLINGE ALUMINIUM AB

If no copy of the IA and, if required under Art. 22(1) PCT, translation thereof is attached hereto, this implies that the International Bureau has already furnished such copy and such translation to you. It is requested that designation of those States in respect of which designation fees have not been paid by the time the period of grace provided for in Rule 85a EPC expires be deemed to have been withdrawn by the applicant and that in this respect no communication pursuant to Rule 69(1) EPC be sent.

I Designation fees are paid in respect of these EPC contracting states:

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II Request for examination, Art. 94, 150(2)/Art. 14(4) and Rule 6(3)/EPC

- (x) Härmad begäres patenterbarhetsprövning för fastställande huruvida rubricerade europeiska patentansökan uppfyller fordringarna enligt EPC.  
(x) It is hereby requested that an examination be carried out to establish whether the European Patent Application and the invention to which it relates meet the requirements of the EPC.

III Representative, please see the general authorisation No. ...., to be entered in the Register of European Patents and to receive notifications (other representatives are given on the authorisation):  
Arnhur Berglund et al. with address indicated below.

.....  
Authorized Representative

**Enclosures:**

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| ( ) Translation of the IA              | (x) Authorisation                |
| ( ) Amendment pursuant to 86(2) EPC    | (x) Designation of inventor      |
| ( ) description ( ) claims ( ) drawing | ( ) Translation of priority doc. |
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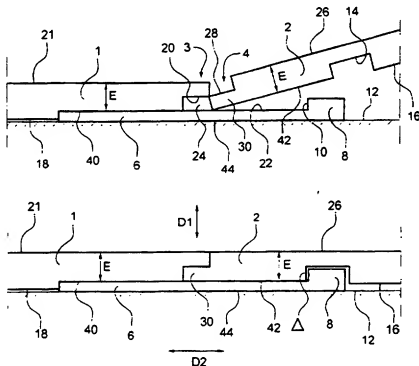
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(71) Applicant (for all designated States except US): VÄLINGE ALUMINIUM AB [SE/SE]; Vångavägen 48, S-260 40 Viken (SE).		Published With international search report. In English translation (filed in Swedish).	
(72) Inventor: and (75) Inventor/Applicant (for US only): PERVAN, Tony [SE/SE]; Rådjurstigen 32, S-170 72 Solna (SE).			
(74) Agent: AWAPATENT AB; P.O. Box 5117, S-200 71 Malmö (SE).			

(54) Title: SYSTEM FOR JOINING BUILDING BOARDS

## (57) Abstract

The invention relates to a system for laying and mechanically joining building panels, especially thin, hard, flooring panels. Adjacent joint edges (3, 4) of two panels (1, 2) engage each other to provide a first mechanical connection locking the joint edges (3, 4) in a first direction (D1) perpendicular to the principal plane of the panels. In each joint, there is further provided a strip (6) which is integrated with one joint edge (3) and which projects behind the other joint edge (4). The strip (6) has an upwardly protruding locking element (8) engaging in a locking groove (14) in the rear side (16) of the other joint edge (4) to form a second mechanical connection locking the panels (1, 2) in a second direction (D2) parallel to the principal plane of the panels and at right angles to the joint. Both the first and the second mechanical connections allow mutual displacement of joined panels (1, 2) in the direction of the joint.



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SYSTEM FOR JOINING BUILDING BOARDSTechnical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

- 5 More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one panel.

- The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

25

Background of the Invention

- A joint of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and  
30 grooves. The locking device for the second mechanical connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint



and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful for joining thick floor panels to form surfaces of a considerable expanse.

Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels employed are laid as "floating floors" without being attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in the groove and forcing the floor panels together. The tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board, and a base layer to balance the construction. The core has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall thickness must be at least about 7 mm. These known laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

Second, the core must be made of moisture-absorbent material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the floors thinner using so-called compact laminate, because

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of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

Third, since the laminate layer of the laminated floors is highly wear-resistant, tool wear is a major  
5 problem when working the surface in connection with the formation of the tongue.

Fourth, the strength of the joint, based on a glued tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the  
10 depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in air humidity.

Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to every panel on both the long and short sides thereof.

Sixth, it is not possible to disassemble a glued floor once laid, without having to break up the joints.  
20 Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out panels be replaced without extensive efforts, which would  
25 be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

Seventh, known laminated floors are not suited for such use as involves a considerable risk of moisture  
30 penetrating down into the moisture-sensitive core.

Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam or the like, which is to damp impact sounds and to make  
35 the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

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must be placed in edge-to-edge fashion. Different underlays affect the properties of the floor.

There is thus a strongly-felt need to overcome the above-mentioned drawbacks of the prior art. It is however not possible simply to use the known joining technique with glued tongues and grooves for very thin floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is, no viable alternative either. Especially, biased clips of this type cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in con-

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nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where  
5 the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at  
10 their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

- A main object of the invention therefore is to provide  
15 a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

- A particular object of the invention is to provide a  
20 panel-joining system which

- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the  
25 panels;
- can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day  
30 floors even at a thickness of 3 mm;
- makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- 35 - reduces tool wear when manufacturing floor panels with hard surface layers;

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- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- 5 - makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

- 15 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

- 20 a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge
- 25 of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

- that the locking device further comprises a strip integrated with the other of said panels, termed strip
- 30 panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with
- 35 its locking element received in the locking groove of the groove panel,

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that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

that the second mechanical connection is so conceived as to allow the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip.

The term "rear side" as used above should be considered to comprise any side of the panel located behind/ underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion of the joint edge.

It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can counteract or prevent such displacement and/or upward angling.

5 The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-  
10 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking  
15 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a system is provided which permits precise joining of thin floor panels having, for example, a  
20 thickness of the order of 3 mm and which at the same time provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip  
25 panel and which exhibits an exact, predetermined distance from its bottom to the front side of the strip panel. The part of the strip projecting behind the groove panel  
30 engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance from its bottom to the front side of the groove panel. The thickness of the strip then is at least so great that  
35 the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This  
40 levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material  
45 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an

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In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of

According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

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tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the strip panel.

The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

The above and other features and advantages of the invention will appear from the appended claims and the following description of embodiments of the invention.

The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

5 Description of Drawing Figures

Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

- 10 Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

- 15 Figs 4a and 4b show a floor panel according to Figs 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

- 20 Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

25 Description of Preferred Embodiments

Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1

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having a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has

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a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action.

As appears from Figs 4a and 4b, each panel in the system has a strip 6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

section can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

The strip 6 is mounted in a tolerance-equalising groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel 2 has a corresponding tolerance-equalising surface or groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the strip 6 is so chosen that the underside 44 of the strip is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently transmitted to the subfloor 12 without any stresses being exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels. Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.

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Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24. The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail from below in the perspective view of Fig. 6.

Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.

The embodiment of Figs 2a-c is further characterised in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2

towards the subfloor 12 (Fig. 2b), as well as a portion 36 which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

5 Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically  
10 towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel  
15 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the  
20 locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The  
25 method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is per-  
30 formed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on  
35 to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint

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edges 3, 4 have been brought into complete engagement with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip

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panel 1, the projecting part of the strip 6 thus forming an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of panels in all four directions with respect to the initial position.

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## CLAIMS

1. A system for providing a joint along adjacent  
5 joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a  
first mechanical connection locking the joint edges (3,  
4) to each other in a first direction (D1) at right  
10 angles to the principal plane of the panels (1, 2), and  
a locking device (6, 8, 14) arranged on the rear  
side (18, 16) of the panels (1, 2) forms a second mechanical connection locking the panels (1, 2) to each other  
in a second direction (D2) parallel to the principal  
15 plane and at right angles to the joint edges (3, 4), said  
locking device (6, 8, 14) comprising a locking groove  
(14) which extends parallel to and spaced from the joint  
edge (4) of one (2) of said panels, termed groove panel,  
and which is open at the rear side (16) of the groove  
20 panel (2), characterised in

that the locking device (6, 8, 14) further comprises  
a strip (6) integrated with the other (1) of said panels,  
termed strip panel, said strip (6) extending throughout  
substantially the entire length of the joint edge (3) of  
25 the strip panel (1) and being provided with a locking  
element (8) projecting from the strip, such that when the  
panels are joined together, the strip (6) projects on the  
rear side of the groove panel (2) with its locking element  
(8) received in the locking groove (14) of the  
30 groove panel (2),

that the panels, when joined together, can occupy a  
relative position in said second direction (D2) where a  
play ( $\Delta$ ) exists between the locking groove (14) and a  
locking surface (10) on the locking element (8) that is  
35 facing the joint edges and is operative in said second  
mechanical connection,

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that the first and the second mechanical connection both allow mutual displacement of the panels (1, 2) in the direction of the joint edges (3, 4), and

that the second mechanical connection is so conceived as to allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6).

2. A system as claimed in claim 1, characterised in that when the groove panel (2) is pressed against the strip panel (1) in said second direction (D2) and is turned angularly away from the strip (6), the maximum distance between the axis of rotation of the groove panel (2) and the locking surface of the locking groove (14) closest to the joint edges is such that the locking element (8) can leave the locking groove (14) without contacting the locking surface of the locking groove (14).

3. A system as claimed in claim 1 or 2, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6) through a height in said first direction that is less than or equal to 2 mm.

4. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection is provided by the joint edge (4) of the groove panel (2) engaging, in said first direction, between the joint edge (3) of the strip panel (1) and the front side of the strip (6).

5. A system as claimed in any one of the preceding claims, characterised in that the strip (6) integrated with the strip panel (1) is made of a material different from that of the strip panel (1) and fixedly mounted on the strip panel (1) at the factory.

6. A system as claimed in claim 5, characterised in that the strip (6), at least for one of the two panels (1, 2), is received in a countersunk

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groove (40; 42) in the rear side (18; 16) of this one panel (1; 2).

7. A system as claimed in claim 5 or 6, characterised in

5 that the strip (6) is mounted in an equalising groove (40) which is countersunk in the rear side (18) of the strip panel (1) and exhibits an exact, predetermined distance (E) from its bottom to the front side (21) of the strip panel (1),

10 that the part of the strip (6) projecting behind the groove panel (2) engages a corresponding equalising groove (42) which is countersunk in the rear side (16) of the groove panel (2) and which exhibits the same exact, predetermined distance (E) from its bottom to the front side (26) of the groove panel (2), and

that the strip (6) has at least such a thickness that the rear side (44) of the strip is flush with the rear sides (18, 16) of the panels.

8. A system as claimed in claim 7, characterised in that the strip (6) has such a thickness that it is only partly received in the equalising grooves (40, 42).

9. A system as claimed in any one of claims 5-8, characterised in that the strip (6) is fixed to the strip panel (1) by means of a mechanical connection.

10. A system as claimed in claim 6, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a gripping edge (52) defined by two recesses (24, 50) in the rear side (18) of the strip panel, and tongues, lips or the like (54, 56) which are bent or punched from the strip (6) and which press against opposite outer sides of the gripping edge (52).

11. A system as claimed in claim 6, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a recess

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(58) in the rear side (18) of the strip panel, and tongues, lips or the like (60) which are bent or punched from the strip (6) and which press against opposing inner sides of the recess (58).

5 12. A system as claimed in any one of claims 5-11, characterised in that the strip (6) is fixed to the strip panel (1) by means of a binder.

13. A system as claimed in any one of claims 5-12, characterised in that the strip (6) is made of  
10 a flexible, preferably resilient material, such as sheet aluminium.

14. A system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6).  
15

15. A system as claimed in any one of claims 1-13, characterised in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

16. A system as claimed in any one of the preceding claims, characterised in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type  
20 and a second mechanical connection of the aforementioned type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type  
25 type, and a second pair of opposite joint edges (3', 4'), one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.  
30

17. A system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.  
35

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18. A system as claimed in claim 17, characterised in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in  
5 said second direction relative to the joint edges (3, 4).

19. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the  
10 like, is provided on the front side (22) of the strip between the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).

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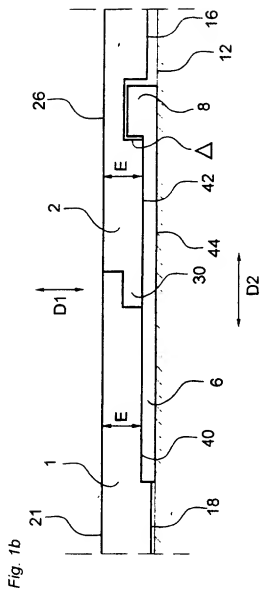
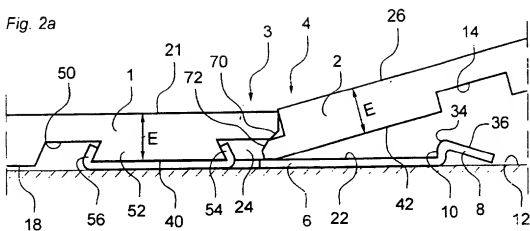
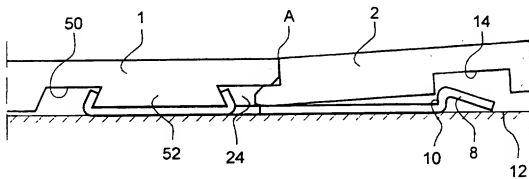




Fig. 2a



*Fig. 2b*



*Fig. 2c*

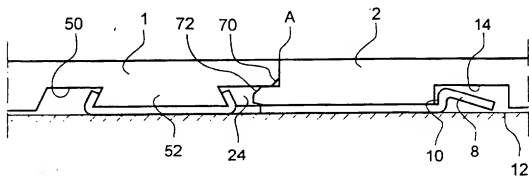


Fig. 3a

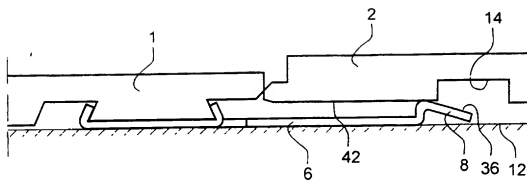


Fig. 3b

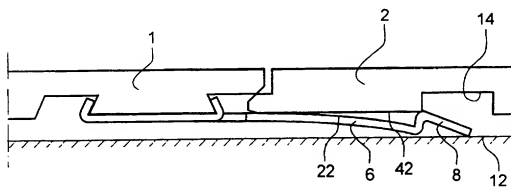


Fig. 3c

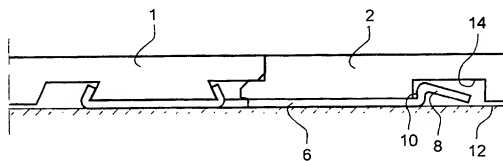


Fig. 4a

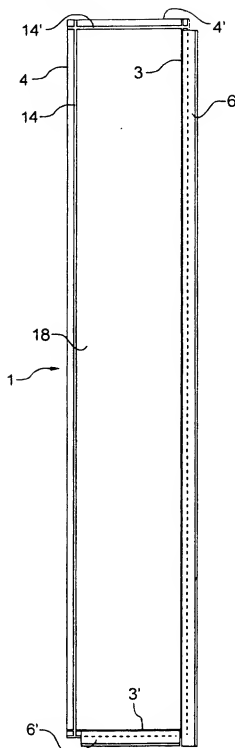
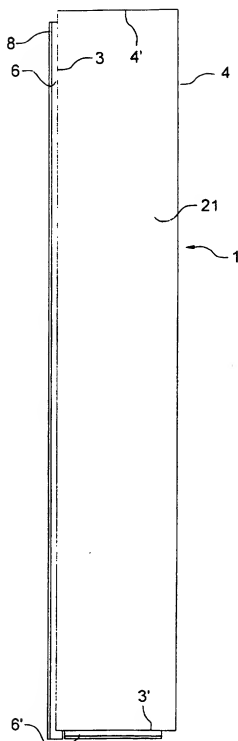


Fig. 4b



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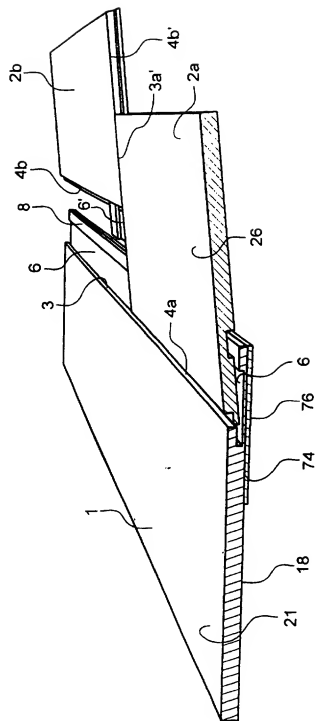


Fig. 5



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00386

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: E04F 15/14, E04F 15/02, E04F 13/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: E04F, A47G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	WO, A1, 9313280 (JUNCKERS INDUSTRIER A/S), 8 July 1993 (08.07.93), abstract, details 1,2,3,14 --	1-19
A	US, A, 3538665 (P. GOHNER), 10 November 1970 (10.11.70), details 7,9 --	1-19
A	DE, A1, 2616077 (HEWENER, H.J.), 27 October 1977 (27.10.77), figure 1 --	1-19

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

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Date of the actual completion of the international search

7 July 1994

Date of mailing of the international search report

10 -08- 1994

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## INTERNATIONAL SEARCH REPORT

International application No.

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR, A, 1293043 (ETABLISSEMENTS PIRAUD PLASTIQUES), 2 April 1962 (02.04.62), figure 2, details 8,9,10, 11  -- -----	1-19

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INTERNATIONAL SEARCH REPORT  
Information on patent family members

28/05/94

International application No.  
PCT/SE 94/00386

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 9313280	08/07/93	NONE	
US-A- 3538665	10/11/70	NONE	
DE-A1- 2616077	27/10/77	NONE	
FR-A- 1293043	02/04/62	NONE	

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(International Application (IA-PCT) No. PCT/SE94/00386  
Applicant(s): VALINGE ALUMINIUM AB

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le(s) soussigné(s)<sup>1</sup>

BERGLUND, Arthur

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désigne(nt) en tant qu'inventeur(s)<sup>2</sup>:

PERVAN, Tony  
Rådjurssstigen 32  
S-170 72 SOLNA  
Sweden

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Anmeldung Nr./Application No./Demande n°./Patent Nr./Patent No./Brevet n°.

94915725.9-2303

/ 0698162

Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire

VALINGE ALUMINIUM AB

# NOTIFICATION OF EUROPEAN PUBLICATION NUMBER AND INFORMATION ON THE APPLICATION OF ARTICLE 67(3) EPC

The provisional protection under Article 67(1) and (2) EPC in the individual Contracting States becomes effective only when the conditions referred to in Article 67(3) EPC have been fulfilled (for further details, see information brochure of the European Patent Office "National Law relating to the EPC" and additional information in the Official Journal of the European Patent Office).

Pursuant to Article 158(1) EPC the publication under Article 21 PCT of an international application for which the European Patent Office is a designated Office takes the place of the publication of a European patent application.

The bibliographic data of the above-mentioned Euro-PCT application will be published on 28.02.96 in Section I.1 of the European Patent Bulletin.

The European publication number is 0698162.

In all future communications to the European Patent Office, please quote the application number plus Directorate number.

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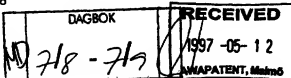
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Formalities officer  
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Assistant  
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Application No./Patent No. 94915725.9-2303	Ref. 2950767	Date 05.05.97
Applicant/Proprietor VALINGE ALUMINIUM AB		

**Communication pursuant to Article 96(2) and Rule 51(2) EPC**

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(3) and 83(2) and (4) EPC.

Amendments to the description, claims and drawings are to be filed where appropriate within the said period in **three copies** on separate sheets (Rule 38(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



H. Plugge  
 Primary examiner  
 for the Examining Division

Enclosures: 1 page/s reasons (Form 2906)

Registered letter  
 EPO Form 2007.1 10.96

90005744-602201



## Beschreibung/Protokoll (Anlage)

Datum  
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## Communication/Minutes (Annex)

Blatt  
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Feuille

## Notification/Procès-verbal (Annexe)

Anmelde-Nr.:  
Application No.: 94 915 725.9  
Demande n°:

The examination is being carried out on the application as originally filed with the EPO, thus as published under the PCT.

\*\*\*\*\*

- 1). With regard to the available prior art the present application meets the requirements of the EPC for patentability.

In claim 1, second to last paragraph, the definition is of a connection which allows mutual displacement of the panels in the direction of the joint edges.

The applicant is requested to confirm that this is indeed the intended limitation, rather than that the panels can move relative to each other in a direction perpendicular to the edges.

90005744-022701

Handled by  
Sören Giver/UA

Attention  
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REGISTERED MAIL

EUROPEAN PATENT OFFICE  
D-80298 MÜNCHEN

European Patent Application No 94915725.9-2303  
in the name of VÄLINGE ALUMINIUM AB

Dear Sirs,

This is in response to your Communication pursuant to Article 96(2) EPC.

It is hereby confirmed that the claim feature relating to the mutual displacement of the panels *in the direction of the joint edges* is an intended limitation. This is an essential feature of the invention, representing an important functional difference between prior-art panel connections using glue or spring clips. Contrary to the present invention, these two conventional connection types do not allow for any mutual displacement of the panels in the direction of the joint edges.

The mutual displacement of the panels in the direction of the joint edges is essential, because it makes it possible to mechanically connect not only e.g. the long edges of the panels, but also the short edges. Thus, as described in the application, when a new panel is to be connected, this is essentially performed in a two-step operation. The first step consists of connecting the new panel at its long edge to the long edge of an adjacent panel already assembled on the floor in a neighbouring row. As illustrated in the drawings, this first step can be performed by first positioning the new panel adjacent to the panel on the floor, while holding the

HELSINGBORG		VAT No. SE556082702301		Other AWA offices:	
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new panel inclined upwards. Then, the new panel is turned downwards into contact with the floor. The first step of the two-step operation is then completed. The second step of the operation consists of mechanically connecting one end edge of the new panel with an adjacent end edge of a previously laid panel in the same row. This is done by displacing the new panel along its long edge, in relation to the adjacent panel in the neighbouring row. Thereby, the two end edges can be brought together and be mechanically connected to each other as disclosed in the application. Accordingly, the mutual displacement of the panels in the direction of the joint edges is an essential feature of the invention and makes it possible to perform the above second step of the assembly operation.

However, the limitation in the preceding paragraph of claim 1 - that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and the locking surface of the locking element - was introduced into claim 1 mainly in order to distinguish the invention from prior-art spring clips, where the spring clips are biased towards the panel material in grooves provided in the lower side of the panels. The prosecution of the present application clearly indicating that the combination of the remaining features in claim 1 is both novel and inventive over the prior art, it is hereby requested, as a primary request, that the application be granted based on the enclosed new claims 1-20 with the heading "New claims - primary request". Claim 1 according to the primary request does not comprise the above limitation regarding the play. It is submitted that this amendment does not contravene Article 123(2) EPC.

As a secondary request, in case the claims according to the primary request cannot be granted, the claims should be amended in accordance with the enclosed amended claims 1-20 with the heading "New claims - secondary request".

In the new claims, according to the primary as well as the secondary request, a new claim 14 has been introduced, dependent from any one of claims 1-4. According to new claim 14, the strip is *integrally formed* with the strip panel, i.e. made in one piece with the strip panel. This embodiment according to new claim 14 is disclosed in fig. 5 and is an alternative to the embodiment according to claim 5, wherein the strip is made of a material different from that of the strip panel and fixedly mounted on the strip panel at the factory. The support for new claim 14 can be found in the application on page 12, lines 23 and 24 ("alternatively, the strip 6 may be integrally formed with the strip panel 1") and on page 17, line 34 to page 18, line 2





~~NEW CLAIMS SECONDARY REQUEST~~

1. A system for providing a joint along adjacent  
 5 joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a first mechanical connection locking the joint edges (3, 4) to each other in a first direction (D1) at right angles to the principal plane of the panels (1, 2), and  
 10 a locking device (6, 8, 14) arranged on the rear side (18, 16) of the panels (1, 2) forms a second mechanical connection locking the panels (1, 2) to each other in a second direction (D2) parallel to the principal  
 15 plane and at right angles to the joint edges (3, 4), said locking device (6, 8, 14) comprising a locking groove (14) which extends parallel to and spaced from the joint edge (4) of one (2) of said panels, termed groove panel, and which is open at the rear side (16) of the groove  
 20 panel (2), characterised in

that the locking device (6, 8, 14) further comprises a strip (6) integrated with the other (1) of said panels, termed strip panel, said strip (6) extending throughout substantially the entire length of the joint edge (3) of  
 25 the strip panel (1) and being provided with a locking element (8) projecting from the strip, such that when the panels are joined together, the strip (6) projects on the rear side of the groove panel (2) with its locking element (8) received in the locking groove (14) of the  
 30 groove panel (2),

that the panels, when joined together, can occupy a relative position in said second direction (D2) where a play ( $\Delta$ ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is  
 35 facing the joint edges and is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels (1, 2) in the direction of the joint edges (3, 4), and

that the second mechanical connection is so conceived as to allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6).

2. A system as claimed in claim 1, characterised in that when the groove panel (2) is pressed against the strip panel (1) in said second direction (D2) and is turned angularly away from the strip (6), the maximum distance between the axis of rotation of the groove panel (2) and the locking surface of the locking groove (14) closest to the joint edges is such that the locking element (8) can leave the locking groove (14) without contacting the locking surface of the locking groove (14).

3. A system as claimed in claim 1 or 2, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6) through a height in said first direction that is less than or equal to 2 mm.

4. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection is provided by the joint edge (4) of the groove panel (2) engaging, in said first direction, between the joint edge (3) of the strip panel (1) and the front side of the strip (6).

5. A system as claimed in any one of the preceding claims, characterised in that the strip (6) integrated with the strip panel (1) is made of a material different from that of the strip panel (1) and fixedly mounted on the strip panel (1) at the factory.

6. A system as claimed in claim 5, characterised in that the strip (6), at least for one of the two panels (1, 2), is received in a countersunk

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groove (40; 42) in the rear side (18; 16) of this one panel (1; 2).

7. A system as claimed in claim 5 or 6, characterised in

5 that the strip (6) is mounted in an equalising groove (40) which is countersunk in the rear side (18) of the strip panel (1) and exhibits an exact, predetermined distance (E) from its bottom to the front side (21) of the strip panel (1),

10 that the part of the strip (6) projecting behind the groove panel (2) engages a corresponding equalising groove (42) which is countersunk in the rear side (16) of the groove panel (2) and which exhibits the same exact, predetermined distance (E) from its bottom to the front  
15 side (26) of the groove panel (2), and

that the strip (6) has at least such a thickness that the rear side (44) of the strip is flush with the rear sides (18, 16) of the panels.

8. A system as claimed in claim 7, characterised  
20 terised in that the strip (6) has such a thickness that it is only partly received in the equalising grooves (40, 42).

9. A system as claimed in any one of claims 5-8, characterised in that the strip (6) is fixed  
25 to the strip panel (1) by means of a mechanical connection.

10. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a gripping edge (52) defined by two recesses (24, 50) in the  
30 rear side (18) of the strip panel, and tongues, lips or the like (54, 56) which are bent or punched from the strip (6) and which press against opposite outer sides of the gripping edge (52).

35 11. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a recess

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(58) in the rear side (18) of the strip panel, and tongues, lips or the like (60) which are bent or punched from the strip (6) and which press against opposing inner sides of the recess (58).

5        12. A system as claimed in any one of claims 5-11, characterised in that the strip (6) is fixed to the strip panel (1) by means of a binder.

10       13. A system as claimed in any one of claims 5-12, characterised in that the strip (6) is made of a flexible, preferably resilient material, such as sheet aluminium.

15       14. A system as claimed in any one of claims 1-4, characterised in that the strip (6) is integrally formed with the strip panel (1), i.e. made in one piece with the strip panel (1).

15       15. A system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6).

20       16. A system as claimed in any one of claims 1-14, characterised in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

25       17. A system as claimed in any one of the preceding claims, characterised in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type and a second mechanical connection of the aforementioned type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type, and a second pair of opposite joint edges (3', 4'), one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.

35

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18. A system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.

5 19. A system as claimed in claim 18, characterised in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in  
10 said second direction relative to the joint edges (3, 4).

20. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip be-  
15 tween the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).

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## NEW CLAIMS - PRIMARY REQUEST

1. A system for providing a joint along adjacent  
 5 joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a  
 first mechanical connection locking the joint edges (3,  
 4) to each other in a first direction (D1) at right an-  
 10 gles to the principal plane of the panels (1, 2), and  
 a locking device (6, 8, 14) arranged on the rear  
 side (18, 16) of the panels (1, 2) forms a second mecha-  
 nical connection locking the panels (1, 2) to each other  
 in a second direction (D2) parallel to the principal  
 15 plane and at right angles to the joint edges (3, 4), said  
 locking device (6, 8, 14) comprising a locking groove  
 (14) which extends parallel to and spaced from the joint  
 edge (4) of one (2) of said panels, termed groove panel,  
 and which is open at the rear side (16) of the groove  
 20 panel (2), characterised in

that the locking device (6, 8, 14) further comprises  
 a strip (6) integrated with the other (1) of said panels,  
 termed strip panel, said strip (6) extending throughout  
 substantially the entire length of the joint edge (3) of  
 25 the strip panel (1) and being provided with a locking  
 element (8) projecting from the strip, such that when the  
 panels are joined together, the strip (6) projects on the  
 rear side of the groove panel (2) with its locking ele-  
 ment (8) received in the locking groove (14) of the  
 30 groove panel (2),

that the first and the second mechanical connection  
 both allow mutual displacement of the panels (1, 2) in  
 the direction of the joint edges (3, 4), and

that the second mechanical connection is so conceived  
 35 as to allow the locking element (8) to leave the lock-

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ing groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6).

2. A system as claimed in claim 1, characterised in that when the groove panel (2) is pressed against the strip panel (1) in said second direction (D2) and is turned angularly away from the strip (6), the maximum distance between the axis of rotation of the groove panel (2) and the locking surface of the locking groove (14) closest to the joint edges is such that the locking element (8) can leave the locking groove (14) without contacting the locking surface of the locking groove (14).

3. A system as claimed in claim 1 or 2, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6) through a height in said first direction that is less than or equal to 2 mm.

4. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection is provided by the joint edge (4) of the groove panel (2) engaging, in said first direction, between the joint edge (3) of the strip panel (1) and the front side of the strip (6).

5. A system as claimed in any one of the preceding claims, characterised in that the strip (6) integrated with the strip panel (1) is made of a material different from that of the strip panel (1) and fixedly mounted on the strip panel (1) at the factory.

6. A system as claimed in claim 5, characterised in that the strip (6), at least for one of the two panels (1, 2), is received in a countersunk groove (40; 42) in the rear side (18; 16) of this one panel (1; 2).

7. A system as claimed in claim 5 or 6, characterised in that the strip (6) is mounted in an equalising groove (40) which is countersunk in the rear side (18) of



the strip panel (1) and exhibits an exact, predetermined distance (E) from its bottom to the front side (21) of the strip panel (1),

that the part of the strip (6) projecting behind the  
5 groove panel (2) engages a corresponding equalising groove (42) which is countersunk in the rear side (16) of the groove panel (2) and which exhibits the same exact, predetermined distance (E) from its bottom to the front side (26) of the groove panel (2), and

10 that the strip (6) has at least such a thickness that the rear side (44) of the strip is flush with the rear sides (18, 16) of the panels.

8. A system as claimed in claim 7, characterised  
15 terised in that the strip (6) has such a thickness that it is only partly received in the equalising grooves (40, 42).

9. A system as claimed in any one of claims 5-8, characterised  
20 terised in that the strip (6) is fixed to the strip panel (1) by means of a mechanical connection.

10. A system as claimed in claim 9, characterised  
25 terised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a gripping edge (52) defined by two recesses (24, 50) in the rear side (18) of the strip panel, and tongues, lips or the like (54, 56) which are bent or punched from the strip (6) and which press against opposite outer sides of the gripping edge (52).

11. A system as claimed in claim 9, characterised  
30 terised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a recess (58) in the rear side (18) of the strip panel, and tongues, lips or the like (60) which are bent or punched from the strip (6) and which press against opposing inner  
35 sides of the recess (58).

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12. A system as claimed in any one of claims 5-11, characterised in that the strip (6) is fixed to the strip panel (1) by means of a binder.

13. A system as claimed in any one of claims 5-12, characterised in that the strip (6) is made of a flexible, preferably resilient material, such as sheet aluminium.

14. A system as claimed in any one of claims 1-4, characterised in that the strip (6) is integrally formed with the strip panel (1), i.e. made in one piece with the strip panel (1).

15. A system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6).

16. A system as claimed in any one of claims 1-14, characterised in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

17. A system as claimed in any one of the preceding claims, characterised in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type and a second mechanical connection of the aforementioned type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type, and a second pair of opposite joint edges (3', 4'), one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.

18. A system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.

19. A system as claimed in claim 18, characterised in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in  
5 said second direction relative to the joint edges (3, 4).

20. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the  
10 like, is provided on the front side (22) of the strip between the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).

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1997 -10- 27

AWAPATENT, Malmö

Datum/Date

24. 10. 97

Anm./Ref./Réf. 2950767	Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°. 94915725.9-2303/0698162
Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire VALINGE ALUMINIUM AB	

DAGBOX	
24/11	24/12

# COMMUNICATION PURSUANT TO ARTICLE 115(2) EPC

Please find enclosed observations by a third party concerning the  
 patentability of the invention of the above-mentioned patent applica-  
 tion. That person is not a party to the proceedings before the EPO  
 (Art. 115(1) EPC).

Under Article 115(2) EPC you may comment on the observations.

Formalities Officer  
 Tel. No. 089/2399 - 2449

Françoise Ide

## BUREAU M.F.J. BOCKSTAEL

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EUROPEAN PATENT OFFICE  
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DUITSLAND

U/V Ref

O/N Ref A.13586

GV/sr

7 October 1997

Dear Sirs,

2303

re: European patent application no 94915725 (Publ.No 0.698.162).  
in the name of : VALINGE ALUMINIUM AB.Under article 115 EPC, we present following observations, regarding the  
above mentioned application.In the reply of the applicant dated 26 June 1997, (in response to the  
first examination report of 7 May 1997) the applicant filed a primary  
and a secondary request of new claims.Claim 1 of the primary request, the scope of which is larger than the  
scope of the originally filed claim 1, is based on the assertion by the  
applicant that the feature that two panels engaged into each other can  
mutually be displaced in their longitudinal direction is new (citation:  
"... the mutual displacement of the panels in the direction of the  
joint edges is an essential feature of the invention...").We would like to draw the Examiner's attention to the fact that the  
feature that the panels can be mutually displaced in longitudinal  
direction, is common technology for as long as flooring panels  
(provided with tongue and groove) exist.

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TEL. (03) 225 00 80 (4L) • FAX (03) 233 71 82 • TELEX 32 879 • TELEGR. : PATENTBURO-ANTWERPEN • N.R.A.R.C.A. 25 541 • BTW/V.A. BE 400.526.955  
BANKEN-BANQUES : BBL 320-0007638-42 • KB 409-8613001-77 • CL 610-0023220-31 • PCR-CCP 000-0278395-05We staan borg voor de grootste zorg besteed aan de uitvoering van de gevende diensten. Noodgedwongen zijn we dus alleen verantwoordelijk in geval van mentioneerde vergissingen.  
Nous garantissons le maximum de soins apportés aux travaux d'investigations et ants. Nous ne pouvons donc être tenus responsables que pour les erreurs mentionnées.

2.

Indeed, as shown in enclosure 1, when engaging a flooring panel A with already installed flooring panels B and C, the flooring panel A is first coupled to the flooring panels B (tongue and groove are coupled), and subsequently the flooring panel A, in coupled condition, is moved to flooring panel C, as shown by arrow F, e.g. by exerting a force on the end E by means of a hammer.

It is clear that in practice it is never possible to couple flooring panel A to flooring panel B directly from the beginning closely to the flooring panel C.

It is clear that this technique already exists as long as flooring panels exist which are provided with tongue and groove.

\*  
\* \*

Also the document WO 93/13280, which was cited in the search report, of the abovesaid European patent application, clearly discloses panels which in coupled condition can be mutually displaced in longitudinal direction. Indeed, as shown in the drawings and as described in the text of WO 93/13280, the legs 2-3 fit into "SLOTS" 14-15, which means that there is no obstruction which can hinder a mutual displacement of two coupled panels in the longitudinal direction. Indeed, when for example exerting a force in longitudinal direction on the panel 13, this panel 13 will be displaced in that direction, whereby it is sliding with the slot 15 over the leg 3.

That a mutual displacement between the two panels of JUNKERS (WO 93/13280) MUST be possible is also clear when taking in account their commercialised product. Hereto we enclose photographs of this product (photographs 1 to 5 of enclosure 2), as well as drawings (enclosures 3 and 4) which are prepared from enlargements of photographs 1 and 2.

./.

From this commercialised product, it is clear that the flooring panels of JUNKERS are provided with tongue and groove at the longitudinal edges as well as at the short edges. As tongues and grooves are provided at both, longitudinal and short edges, it is clear that the panels of JUNKERS can only be coupled to each other by first engaging the longitudinal edges of two adjacent panels and subsequently displacing the last coupled panel in longitudinal direction, in order to obtain that also the coupling at the shorter edges becomes realised. It is clear that the coupling of the panels at the short edges should not be possible when the panels cannot be moved in longitudinal direction.

It should also be noted that, after having provided the flooring board of JUNKERS with a plate-shaped body 1 as disclosed in WO 93/13280, (see also photograph 1), a structure is obtained which shows all features of claim 1 of the primary request.

For the reasons explained above, we are of the opinion that at least claim 1 of the primary request does not fulfill the requirements of article 54 EPC.

It is respectfully requested that the Examiner handling the European patent application no 94915725 should take in consideration the above comments.

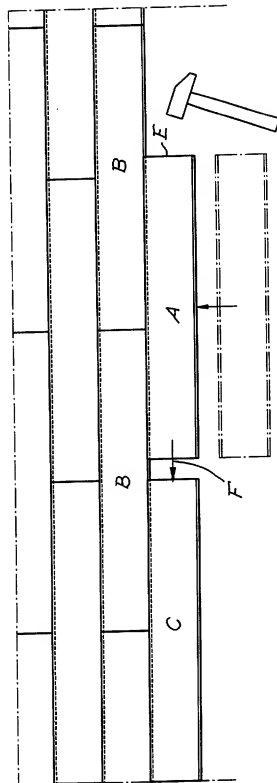
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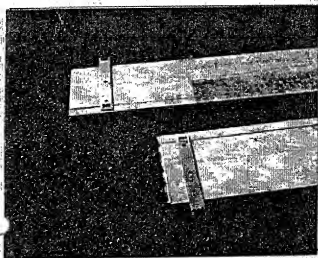
E. Donn  M.Sc.  
European Patent Attorney

Encl.

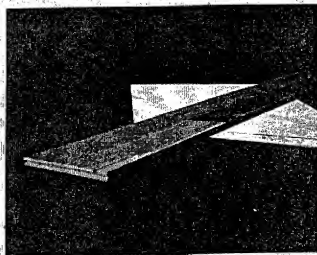
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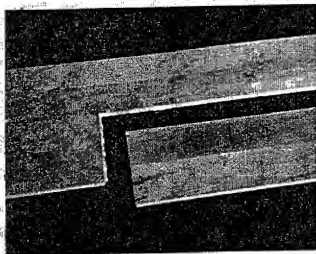




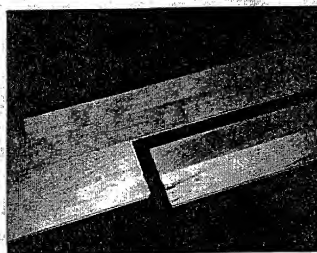
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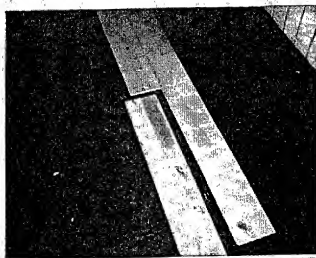
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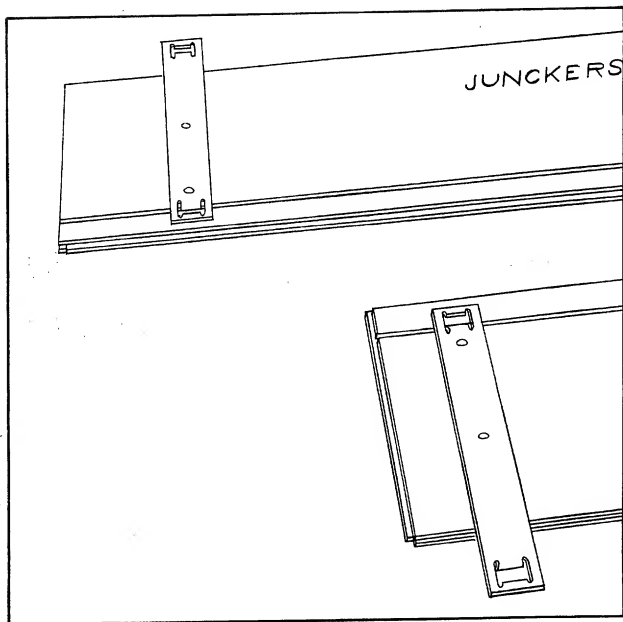
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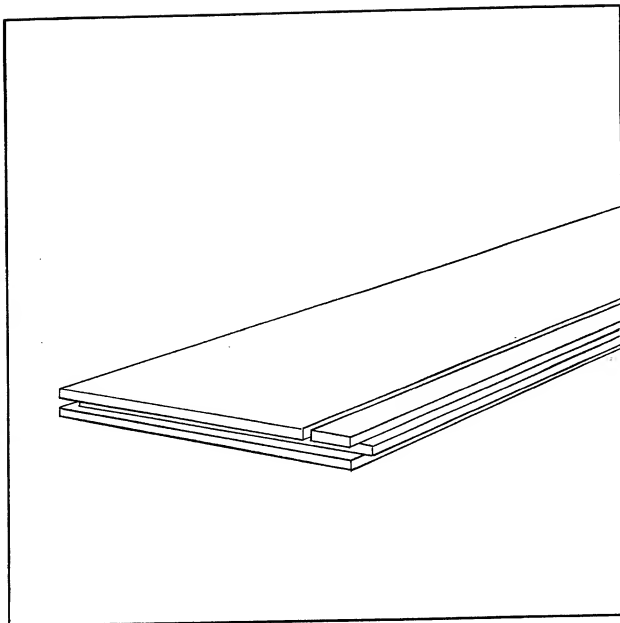


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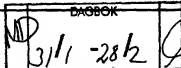
Telephone Numbers:

Primary Examiner (substantive examination) (089) 2399-2486

Formalities Officer / Assistant (Formalities and other matters) (089) 2399-2438



Application No. 94 915 725.9-2303	Ref. 2950767	Date 31.10.97
Applicant VALINGE ALUMINIUM AB		



Communication pursuant to Article 96(2) and Rule 51(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(3) and 83(2) and (4) EPC.

Amendments to the description, claims and drawings are to be filed where appropriate within the said period in three copies on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



4/2

PLUGGE H B  
Primary Examiner  
for the Examining Division

Enclosure(s): 2 page/s reasons (Form 2906)

90005744-022701

**Bescheid/Protokoll (Anlage)**Datum  
Date 3 1. 10. 97  
Date**Communication/Minutes (Annex)**Blatt  
Sheet 1  
Feuille**Notification/Procès-verbal (Annexe)**Anmelde-Nr.:  
Application No.: 94 915 725.9  
Demande n°:

The examination is being carried out on the following application documents:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

**Description, pages:**

1-19 as published

**Claims, No.:**

1-20 as received on 01.07.1997 with letter of 26.06.1997

**Drawings, sheets:**

1-6 as published

**Comments:**

\* **Main request; and claims 1 to 20 of secondary request**

1. The amendments filed with the letter dated 26.06.1997 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 123(2) EPC. The amendment concerned is the deletion of an essential feature of claim 1.

In the originally filed claim 1, it was stated that the panels, when joined together, have play so as to be able to occupy a relative position in the "second" direction.

This feature characterised claim 1 over the closest prior art, SE-A-450 141.

The deletion of this feature contravenes Article 123(2) EPC, as there is no disclosure in the originally filed application that this feature is not an essential feature. It is consistently presented as an essential feature.

Furthermore, by deleting this feature, the subject matter of claim 1 appears to no longer support an inventive step.

Claim 1, according to the primary request, is differentiated from said closest prior art simply in that the strip extends "throughout substantially the entire length of the



Beschreibung/Protokoll (Anlage)

Communication/Minutes (Annex)

Notification/Procès-verbal (Annexe)

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Anmelde-Nr.:  
Application No.:  
Demande n°:

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joint edge".

Such a feature must be considered banal. The skilled man is familiar with fastening systems. The provision of strip fasteners is generally known, with established advantages over discontinuous fasteners (or point fasteners), and he would as a matter of course replace a point fastener with a longitudinally extending fastener where necessary.

For the above reasons, claim 1 of the primary request is not allowable.

2. The insertion of new claim 14 does not appear to present any conflict with Article 123(2) of the EPC, as there is support in the originally filing for the subject matter described therein.
3. The set of claims according to the secondary request appear to meet the requirements for patentability. However, although claim 1 is drafted in the two-part form, many of the features in the characterising portion are disclosed in document SE-A-450 141 in combination with the features disclosed in the preamble.

These features should be transferred from the characterising portion of the claim to the preamble.

In particular the following feature need to transferred to the preamble:

- The entire first paragraph of the characterising portion - except for the statement that "said strip extends throughout substantially the entire length of the panel,
  - The last two paragraphs of the characterising portion of claim 1.
4. The applicant is requested to file amended claims as set out above, based on the secondary request. When these have been received the application can proceed to grant.



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AWAPATENT, Malmö

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AWAPATENT, Helsingborg

Delivery Date

12.01.98

Zeichen/Ref./Réf. 2950767	Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°. 94915725.9-2303/0698162
Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire VALINGE ALUMINIUM AB	

COMMUNICATION PURSUANT TO ARTICLE 115(2) EPC

Please find enclosed observations by a third party concerning the patentability of the invention of the above-mentioned patent application. That person is not a party to the proceedings before the EPO (Art. 115(1) EPC).

Under Article 115(2) EPC you may comment on the observations.

Formalities Officer  
Tel. No. 089/2399 - 2449

  
Françoise Ide

## BUREAU M.F.J. BOCKSTAEL

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MÜNCHEN  
DUITSLAND

U/V Ref:

OIN Ref.: A.135/86  
GV/ec

19 December 1997

confirmation copy

Dear Sirs,

re: European patent application No 94915725.9 (Publ.No. 0.698.162)  
in the name of: VÄLINGE ALUMINIUM AB. 2303Under article 115 EPC, we wish to file following observations,  
regarding the above mentioned European patent application.\*  
\* \*Claim 1:

With respect to claim 1 ("second request") we would like to draw the attention of the Examiner to the prior-art document GB 2.256.023, of which we enclose herewith a copy. We also enclose an additional copy of figures 4 and 5 of this document, on which several indications have been made.

First of all, GB 2.256.023, page 1, second paragraph, discloses a joint which can be used for flooring. Consequently, this document clearly relates to the same technical field as the European patent application No. 94915725.9.

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TEL. (03) 225 00 40 (LJ) • FAX (03) 232 71 62 • TELEX 32 678 • TELEGR.: PATENTBURO-ANTWERPEN • R.R.A.R.C.A. 25 541 • BTWIVA BE 406526.995  
BANKEN-BAHQUES BEL 322-000738-42 • KB 409-891099-77 • CL 410-0023220-31 • PCIB-COP 000-0276395-05

We aan borg voor de grootste zorg beseft aan de uitvoering van de gemaakte verslagen. Hoofdgerechtigde npt we dus alleen verantwoordelijk in geval van onvolledige verslagen.  
Nous garantissons le maximum de soins apportés aux travaux d'investigation et avis. Nous ne pouvons donc être tenus responsables que pour les erreurs mentionnées.



Secondly, it is clear that the joint disclosed in GB 2.256.023 also provides in first and second mechanical connections as claimed in the European patent application No. 94915725.9.

More particularly, as indicated on the enclosed copy of figure 4, the joint of GB 2.256.023 discloses the use of a strip S, which projects on the rear side of a second panel 1' and which is provided with a locking element L (formed by side edge 17b), whereby this locking element is received in a locking groove G at the rear side of said panel 1'. Hereby the locking groove G consists in the recess bordered by the rib 10, on the one hand, and the lower side edge face 11b, on the other hand.

Furthermore, the panels 1 and 1', when joined together, can also occupy a relative position in the direction D2, similar as in the European patent application No. 94915725. More particularly, as indicated on the enclosed additional copy of figures 4 and 5, the joint of GB 2.256.023 clearly shows the "play" claimed in claim 1 of the "second request".

From the aforesaid, it is clear that all features of claim 1 are known from the British patent No. 2.256.023 and consequently the subject-matter of this claim is not new.

\*  
\* \*

With respect to the dependent claims of EP 94915725.9 we would like to draw the attention of the Examiner to the above-mentioned British patent No. 2.256.023, as well as to following documents:

US 3.310.919  
US 3.694.983  
US 3.859.000  
GB 424.057  
GB 1.430.423  
GB 2.117.813  
DE 2.502.992  
DE 3.041.781  
CH 200.949  
FR 2.568.295  
WO 9.313.280

Copies of the abstracts and/or most relevant pages of the above-listed documents are enclosed.

Claim 2:

From figure 4 of GB 2.256.023 one can clearly see that when two panels are pressed against each other and when subsequently panel 1' is turned angularly away from the strip S, the locking element can leave the locking groove G without contacting the locking surface 17b.

Consequently, for this reason, also the subject-matter of claim 2 is not new.

Claim 3:

As normally, panels as shown in GB 2.256.023 have a thickness which varies between approximately 8 mm and 2 cm, it is clear that the locking surface 17b is smaller than 2 mm. For this reason also claim 3 is anticipated by GB 2.256.023.

Claim 4:

GB 2.256.023 discloses that the first mechanical connection is provided by a joint edge (tongue 5) of the first panel, which is engaged between the joint edge (upper lip above groove 6) and the front side of the strip S of the second panel. Therefore we believe that the subject-matter of claim 4 is not new.

Claim 5:

The features of claim 5 that the strip is made of a material different from that of the panel and is fixedly mounted on the panel, are obvious taking into account that flooring panels provided with coupling strips of a material which differs from the material of the panel are already known from US 3.310.919, US 3.694.983 and US 3.859.000.

The feature of claim 5 can also be found in GB 2.117.813. As can be seen in the drawings of this document, the strips 12 and 13 are made of a different material than the plate 11. GB 2.117.813 relates to a wall panel. As the European patent application 94915725.9 relates to building panels, which means wall panels as well as flooring panels, GB 2.117.813 is in the same technical field.

Claim 6:

The feature of claim 6 that such strip 6 is received in a countersunk groove is also obvious, taking into account that the strips disclosed

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in US 3.310.919, US 3.694.983 and US 3.859.000 show also parts which are countersunk in the lower side of the panel.

Claim 9 :

The feature of claim 9 that the strip 6 is fixed to the strip panel 1 by means of a mechanical connection is also known of the above said three American patents, namely US 3.310.919, US 3.694.983 and US 3.859.000, as the strips are also fixedly mounted to the panels.

Claims 10 and 11 :

Using lips or the like which are bent or punched in order to realise a mechanical connection is a technique which is generally known for connecting elements to each other. The use of this technique in flooring panels is within the reach of persons skilled in the art.

According our opinion, therefore claims 10 and 11 are not inventive.

Claim 12 :

Using a binder for connecting two parts to each other, in our opinion, offers no inventive step.

Claim 13 :

The feature of claim 13, stating that the strip is made of a flexible, preferably resilient material, such as sheet aluminium, is also obvious, as according to US 3.859.000 the strips are also made of a metallic material.

Claim 14 :

The feature that the strip 6 is integrally formed with the strip panel 1 is clearly known from the already mentioned document GB 2.256.023, and consequently is not new.

Furthermore the use of strips for coupling flooring panels, these strips being integral with the flooring panels, is generally known from GB 1.430.423, DE 25 02 992, CH 200.949, FR 2.568.295, DE 3.041.781 and GB 424.057.

Claim 15 :

The feature that the locking element consists in a locking edge extending continuously along the strip 6 is not new in view of the joint disclosed in GB 2.256.023. In the latter the locking edge is formed by edge 17b.

Furthermore, the use of continuous locking edges in flooring panels are generally known from GB 1.430.423, DE 25 02 992, CH 200.949, FR 2.568.295, DE 3.041.781 and GB 424.057.

Claim 16 :

The use of spaced apart locking elements is obvious taking into account the teachings of document WO 9313280 (cited in the international search report of the application in question). This document clearly shows that spaced apart elements can be used to couple flooring panels.

Claim 17 :

Claim 17 in fact states that each of the four edges of the panel is provided with a coupling element of the claimed coupling system.

This feature is obvious and not inventive, taking into account that it is generally known to provide flooring panels at each of the four edges with coupling means. Hereto we refer to the drawings of the panels disclosed in GB 424.057, FR 2.568.295 and CH 200.949.

Claim 18 :

The feature to fix an underlay to the rear side of the panel is known of FR 2.568.295. Figure 3 clearly shows the use of such underlay 44.

Claim 19 :

The feature of claim 19, stating that the underlay is fixed so as to cover this strip at least up to the locking element 8 is clearly anticipated by figure 3 of FR 2.568.295. In this figure 3, it can clearly be seen that the underlay 44 covers this strip up to the locking element (languette 31).

Claim 20 :

The use of a sealing strip is not inventive, as the use of a similar strip is already known from document GB 2.117.813 (beads 30 and 31).

\*  
\* \*

It is respectfully requested that the Examiner handling the European patent application No 94915725.9 should take in consideration the above comments.

Yours faithfully.

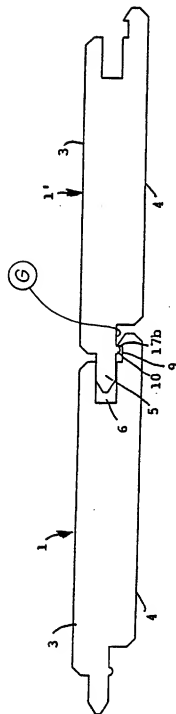
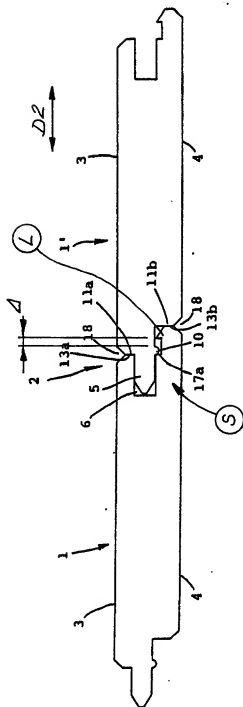


E. Donné M.Sc.  
European Patent Attorney

Encl.: 46 numbered pages.

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## European Patent Application in the name of Välinge Aluminium AB

Dear Mr PLUGGE,

This letter is not a formal response to your Communication.

As agreed upon during our telephone conversation, I hereby send you a proposal for a set of *method claims*, which should be added to the apparatus claims on file if, in your opinion, such addition does not violate Articles 82 and 123(2) EPC.

Via DHL I will send you three parts of panels of the floor as presently being manufactured and sold, and a page from a instruction manual for laying the floor. Of course, the parts sent to you are much shorter than the real panels.

### ***Laying of the sample***

The three panels pieces of the sample are laid in the following sequence, in accordance with the suggested method claim 1:

1. Start by placing panel 1 on the table.
2. Connect panel 2 (by angling it down) to panel 1 such that the letters A, L, L are in line. Panel 1 and 2 should now be resting flat on the table.
3. Hold panel 3 (this panel is termed "the new panel" in the method claims) in a longitudinal position where the two black lines on panel 1 and panel 3, respectively, are aligned with each other, while holding panel 3 at an *angle* upwards relative to panel 1. In this position, panel 3 partly overlaps the locking strip of panel 2 at the short edges, but there is still a small gap between panel 2 and panel 3.
4. *Angle-down* panel 3 to a position where panel 3 is resting on the locking strip of panel 2, at the short edge. In this position, panel 1 and panel 3 are locked together in directions D1 and D2. However, panel 3 can still be displaced relative to panel 1. There is also still a small gap between panel 2 and 3 in the D3 direction.
5. *Displace* panel 3 towards panel 2 (this displacement direction is marked with an arrow) until panel 2 and 3 are connected at their short edges. Panel 2 should be held stationary during this displacement. The new panel is now laid.

For taking up panel 3, panel 2 and 3 can be angled up *together* relative to panel 1. Then, panel 3 can be loosened from panel 2 by angling and/or by displacement in the direction of the short edges.

The difference between the above method according to suggested method claim 1, and the method according to suggested method claim 7 is that in claim 1, panel 1 has a strip facing panels 2 and 3, whereas in claim 7, panel 1 instead has a groove facing panels 2 and 3. Suggested method claim 7 can be implemented by attaching panels 2 and 3 to the opposite long edge of panel 1, i.e. the long edge without any ALLOC-letters.

### **Illustration on the Internet**

An animated 3D illustration showing the laying method according to the method claims can be found on the following internet page:

- <http://www.valingealuminium.se/layen.html>

The home page of the Alloc-system is:

- <http://www.valingealuminium.se/indexen.html>

### **Unity of invention**

In our opinion, the method claims enclosed are not in conflict with the unity requirement according to Art. 82. The system according to the apparatus claims, on the one hand, and the laying method according to the method claims, on the other hand, are so linked as to form a single general inventive concept. The technical relationship involves a number of novel features present in both inventions:

1. The concept of using (i) an integrated locking strip extending essentially along the whole edge and provided with a locking element, together with (ii) a locking groove, where these parts present the structural and functional features set out in both the apparatus claims and the method claims.
2. The concept of using such locking strip/locking groove-connection in combination with a mechanically D1-connection.
3. The concept of accomplishing a mechanical connection in the D1 direction as well as in the D2 direction (These directions are marked on the sample), while at the same time allowing displacement in the D3 direction. Such a displacement cannot be accomplished by prior-art biased spring clips. The possibility of displacement of the new panel, while the same is locked in the D2 direction, is present in both inventions.

### **Support for the method claims**

- page 13, lines 24-28 (each panel having two strips and two grooves)
- page 8, lines 1-3 (locking of all sides)
- page 10, lines 15- (angling down for locking the long edge, and then displacing in D3 direction for locking the short edge)
- page 17, lines 4-11 (placing the new panel's long side upon the locking strip of the first panel, before angling down)
- page 19 (inserting the locking strip under a previously laid panel)
- Fig 5 (taking-up by angling-up panel 2 and 3 together)

In short, the enclosed method claims defines a novel method for joining panels mechanically at both the long edges and the short edges, by using a rotational-type movement for joining the long edges and, after joining the long edges, using a linear-type movement for joining the short edges. The apparatus claims previously filed defines a novel system for implementing such a method.

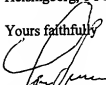


Thus, in accordance with R30 (1) and (2) EPC, there is a technical relationship among the two inventions involving one or more of the same or corresponding special technical features, where such "special technical features" are features which define a contribution which each of the claimed inventions considered as a whole makes over the prior art. Thus, even if the play is not present in the method claims, the latter includes a number of new novel features which are also present in the apparatus claims, and is it our opinion that the novel laying method can be clearly defined as suggested without mentioning the play.

Please give me a call as soon as possible (+46 42 163045 or +46 42 342215(home)) for a discussion about the method claims, and also about point 3 in your Communication of October 31, 1997 and the newly filed observation from third party, especially the first mentioned GB-document which relates to a non-openable snap-locking system allowing swelling of outdoor wooden panels presenting a large gap between the upper edges of adjacent panels.

Helsingborg, 6 February 1998.

Yours faithfully

  
AWAPATENT AB  
Søren Giver

Encls

Method claims (via fax)

Sample (via DHL)

Page from manual (via DHL)

## SUGGESTED METHOD CLAIMS, TO BE ADDED TO THE APPARATUS CLAIMS

1. A method for laying and mechanically joining rectangular building panels in parallel rows, especially floor panels, said panels being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, c h a r a c t e r i s e d i n that:

each panel, at the rear side thereof, being provided with a locking strip at one long edge and at one short edge, and being provided with a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel, and each locking strip being integrated with the panel and extending throughout substantially the entire length of the corresponding edge and being provided with a locking element projecting from the strip, such that when two adjacent panels have been mechanically joined together along adjacent edges thereof, a strip of one of the panels projects on the rear side of the other panel with the locking element of said strip being received in a locking groove of the other panel, thereby locking the two panels to each other also in a second direction (D2) parallel to said principal plane and at right angles to the joined edges;

and in that the method includes the following steps for laying a new panel and mechanically connecting the same to a long edge of a previously laid first panel in a first row and to a short edge of a previously laid second panel in an adjacent second row, said first and second panels being already mechanically connected to each other at adjacent long edges thereof:

1. placing the new panel in the second row, while holding the new panel at an angle relative to a principal plane of the first panel, such that the new panel is spaced from its final longitudinal position relative to said second panel and such that the long edge of the new panel provided with a locking groove is placed upon and in contact with a locking strip at the adjacent long edge of the first panel,
2. subsequently angling down the new panel so as to accommodate the locking element of said strip of the first panel in said locking groove of the new panel, whereby the new panel and the first panel are mechanically connected with each other in said second direction (D2) with respect to the thus-connected long edges, wherein said long edges, in the thus angled-down position of the new panel, being in engagement with each other and thereby mechanically locked together in said first direction (D1) also, and finally

3. displacing the new panel in its longitudinal direction relative to the first panel towards said final longitudinal position until the locking element of one of the short edges snaps up into the locking groove of the other one of the short edges, whereby the new panel and the second panel are mechanically connected with each other in both in said first direction (D1) and in said second direction (D2) with respect to the thus-connected short edges.

2. A method as claimed in claim 1, wherein the locking strip located at the short edges to be locked together is bent downwards as a result of displacing the new panel, until the locking element snaps up into the locking groove.

3. A method as claimed in claim 1 or 2, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking groove for engagement with a locking element of the second panel.

4. A method as claimed in claim 3, wherein the new panel is angled down into a position where the end portion of the new panel facing the second panel is placed upon and in contact with the locking strip at the short edge of the second panel.

5. A method as claimed in claim 1 or 2, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking strip with a locking element for engagement with a locking groove of the second panel.

6. A method according to any one of claims 1-5, wherein the new panel, after having been laid and mechanically joined to the first and to the second panel, can be taken up by angling the new panel and the second panel together in relation to the first panel and subsequently loosening the new panel from the second panel by angling and/or displacing the new panel in relation to the second panel.

7. A method for laying and mechanically joining rectangular building panels in parallel rows, especially floor panels, said panels being provided with means for mechanically locking together their long edges as well as their short edges in a first direction (D1) at right angles to the principal plane of the panels, c h a r a c t e r i s e d i n t h a t

each panel, at the rear side thereof, being provided with a locking strip at one long edge and at one short edge, and being provided with a locking groove at an opposite long edge and at an opposite short edge, each locking groove extending parallel to and spaced from the corresponding edge and being open at a rear side of the panel, and each locking strip being integrated with the panel and extending throughout substantially the entire length of the corresponding edge and being provided with a locking element projecting from the strip, such that when two adjacent panels have been mechanically joined together along adjacent edges thereof, a strip of one of the panels projects on the rear side of the other panel with the locking element of said strip being received in a locking groove of the other panel, thereby locking the two panels to each other also in a second direction (D2) parallel to said principal plane and at right angles to the joined edges;

and in that the method includes the following steps for laying a new panel and mechanically connecting the same to a long edge of a previously laid first panel in a first row and to a short edge of a previously laid second panel in an adjacent second row, said first and second panels being already mechanically connected to each other at adjacent long edges thereof:

1. placing the new panel in the second row, while holding the new panel at an angle relative to a principal plane of the first panel, such that the new panel is spaced from its final longitudinal position relative to said second panel and such that a locking strip provided at a long edge of the new panel is inserted under the adjacent long edge of the first panel being provided with a locking groove,
2. subsequently angling down the new panel so as to accommodate the locking element of said strip of the new panel in said locking groove of the first panel, whereby the new panel and the first panel are mechanically connected with each other in said second direction (D2) with respect to the thus-connected long edges, wherein said long edges, in the thus angled-down position of the new panel, being in engagement with each other and thereby mechanically locked together in said first direction (D1) also, and finally
3. displacing the new panel in its longitudinal direction relative to the first panel towards said final position until the locking element of one of the short edges snaps up into the locking groove of the other one of the short edges, whereby the new panel and the second panel are mechanically connected with each other in both in said first direction (D1) and in said second direction (D2) with respect to the thus-connected short edges.

8. A method as claimed in claim 7, wherein the locking strip located at the short edges to be locked together is bent downwards as a result of displacing the new panel, until the locking element snaps up into the locking groove.

9. A method as claimed in claim 7 or 8, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking groove for engagement with a locking element of the second panel.

10. A method as claimed in claim 9, wherein the new panel is angled down into a position where the end portion of the new panel facing the second panel is placed upon and in contact with the locking strip at the short edge of the second panel.

11. A method as claimed in claim 7 or 8, wherein the short edge of the new panel to be locked to the short edge of the second panel presents a locking strip with a locking element for engagement with a locking groove of the second panel.

12. A method according to any one of claims 1-5, wherein the new panel, after having been laid and mechanically joined to the first and to the second panel, can be taken up by angling the new panel and the second panel together in relation to the first panel and subsequently loosening the new panel from the second panel by angling and/or displacing the new panel in relation to the second panel.

**AWAPATENT**Handled by  
Sören GiverHelsingborg  
23 February 1998Our ref.  
2950767Attention  
DG 2**REGISTERED LETTER****EUROPEAN PATENT OFFICE**  
**D-80298 MÜNCHEN****SENT BY TELECOPIER**European Patent Application No 94915725.9-2303  
in the name of VÄLINGE ALUMINIUM AB

Dear Sirs,

This is in response to your Communication pursuant to Article 96(2), dated 21 October 1997.

Regarding section No. 1 in the Communication, the applicant's main request has been rejected as violating Article 123(2) by the deletion of an essential feature from claim 1. Although the applicant still is of the opinion that the paragraph in question, which was present in claim 1 as filed but which was deleted in claim 1 according to the main request, could be deleted from the claim without adding new matter, it is hereby requested that the application should be proceeded with based on claims 1-20 according to the secondary request submitted with the letter dated 26 June 1997. A fresh copy of these claims in triplicate is hereby enclosed.

However, it should be noted that what is stated in the second paragraph under section No. 1 in the Communication is not correct. In this paragraph the following is stated: *"In the original filed claim 1, it was stated that the panels, when joined together, have (emphasis added) a play so as to be able to occupy a relative position in the "second" direction."* This statement is not correct in the opinion of the applicant. Originally filed claim 1 states that *"the panels,*

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HELINGBORG	S-254 52 HELINGBORG	Fax	+46 42 16 09 42	STOCKHOLM	GÖTEBORG
SWEDEN	SWEDEN	Telex	32407	SÖDERHAMN	VÄXJÖ
		Email	mail@awapatent.com	LIDKÖPING	VARBERG
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when joined together, can (emphasis added) occupy a relative position in said second direction (D2) where a play (A) exists between ....".

Thus, in the application as filed, it is expressly stated that the panels can be brought into a relative position in the D2 direction where a play exists. By this definition in claim 1 as filed, the inventive locking system was further distinguished from prior-art locking systems using spring clips, since such prior-art panels cannot be brought into a relative position where such a play exists. However, the above-identified statement in claim 1 as filed - the statement that the panels can be brought into a relative position where a play exists - is not equivalent to the statement in the Communication saying that a play is always present.

Furthermore, claim 1 according to the main request (i.e. claim 1 not including the definition of the play) has also been rejected in the Communication as defining an invention which is obvious in view of SE-A-450 141. This ground for rejection is based on the assumption that the invention according to claim 1 of the primary request is differentiated from the closest prior art simply in that the strip extends throughout substantially the entire length of the joint edge. As will be discussed in the following, this assumption is not correct according to the applicant, since the invention as defined in claim 1 differs also in other respects from the closest prior art. Therefore, the invention according to claim 1 presents an inventive step over said closest prior art, even without the presence of the definition of the play.

Under section No. 3 in the Communication, dealing with claim 1 of the secondary request, the applicant is requested to transfer a number of features from the characterising portion of claim 1 to the preamble thereof. Especially, the applicant is requested to make this transfer of nearly the entire first paragraph and also the two last paragraphs of the characterising portion of claim 1. A reconsideration of this request for transferring features to the preamble is respectfully requested for the following reasons:

The preamble of claim 1 is based on the closest prior art as disclosed in the above-mentioned document SE-A-450 141. Specifically, the last paragraph of the preamble of claim 1 includes the prior-art feature relating to a locking device arranged on the rear side forming a mechanical connection which locks the panels in said "second" direction. This paragraph in the preamble also states that this rear-side locking device comprises a locking groove. Thus, the preamble of

claim 1 already identifies both the prior-art first mechanical connection and the prior-art second mechanical connection, and also identifies the prior-art locking groove of the second mechanical connection.

However, the second mechanical connection of the invention is implemented in a way that differs substantially from the prior-art spring clips. In the inventive system, the rear-side locking device comprises a strip which is integrated with the panel. Furthermore, this strip extends throughout substantially the entire length of the joint edge. Thus, the term "strip" refers to an element having a longitudinal extension in the direction of the joint edges. The expression "integrated with" is defined in the application as an element which is either fixedly connected to the panel at the factory, or an element integrally formed with the panel. Such an integrated strip extending along the joint edges differs essentially from the separate spring clips described in SE-A-450 141, which are not integrated with the panels and are not extended as defined in claim 1. Therefore, these novel features of the locking device should be retained in the characterising portion. The locking element being part of the novel strip should therefore also be retained in the same paragraph. However, if found necessary during the further examination, the applicant is willing to discuss an alternative wording of claim 1 where some feature relating to a locking element is present in the preamble of claim 1. If this should be necessary, the Examiner is asked to contact the undersigned for a discussion on this point.

Turning now to the two last paragraphs of claim 1, the first one relates to the possibility of relative displacement of the panels in the direction of the joint edges. This feature is an essential feature of the invention and is not present in SE-A-450 141. By including this feature in the invention, it becomes possible to lock the short edges to each other. As explained in the application as filed, the presence of a plurality of spring clips in the prior-art system in SE-A-450 141 will not allow any mutual displacement of the panels in the direction of the joint edges, since the panels are held together very tight by these spring clips. If necessary, a sample of this prior-art system could be submitted in order to demonstrate this fact. Accordingly, this novel feature of the invention should be retained in the characterising portion of claim 1.

The possibility of taking up the panels after laying is the subject matter of the last paragraph of claim 1. The spring clips in the prior-art system in SE-A-450 141 do not allow any taking-



up of the panels after laying by turning a panel angularly from a strip. On the contrary, the spring clips effectively prevents any such attempt, since the they would not leave the grooves and, therefore, since they cannot be extended in their longitudinal direction, would also prevent any rotational movement of one panel in relation to an adjacent panel. It should also be noted that the last paragraph of claim 1 refers to the "strip" which, as stated above, is a novel element in itself. Therefore, this paragraph of claim 1 should be retained in the characterising portion.

As indicated above, if there should remain any objections to the claims filed herewith, the Examiner is respectfully asked to contact the undersigned for a discussion on how such objections can be resolved.

Yours faithfully,



Søren Ølver  
Authorised Representative  
AWAPATENT AB

Encl. Claims in triplicate

1. A system for providing a joint along adjacent  
 5 joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a  
 first mechanical connection locking the joint edges (3,  
 4) to each other in a first direction (D1) at right an-  
 10 gles to the principal plane of the panels (1, 2), and  
 a locking device (6, 8, 14) arranged on the rear  
 side (18, 16) of the panels (1, 2) forms a second mecha-  
 nical connection locking the panels (1, 2) to each other  
 in a second direction (D2) parallel to the principal  
 15 plane and at right angles to the joint edges (3, 4), said  
 locking device (6, 8, 14) comprising a locking groove  
 (14) which extends parallel to and spaced from the joint  
 edge (4) of one (2) of said panels, termed groove panel,  
 and which is open at the rear side (16) of the groove  
 20 panel (2), characterized in

that the locking device (6, 8, 14) further comprises  
 a strip (6) integrated with the other (1) of said panels,  
 termed strip panel, said strip (6) extending throughout  
 substantially the entire length of the joint edge (3) of  
 25 the strip panel (1) and being provided with a locking  
 element (8) projecting from the strip, such that when the  
 panels are joined together, the strip (6) projects on the  
 rear side of the groove panel (2) with its locking ele-  
 ment (8) received in the locking groove (14) of the  
 30 groove panel (2),

that the panels, when joined together, can occupy a  
 relative position in said second direction (D2) where a  
 play (Δ) exists between the locking groove (14) and a  
 locking surface (10) on the locking element (8) that is  
 35 facing the joint edges and is operative in said second  
 mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels (1, 2) in the direction of the joint edges (3, 4), and

that the second mechanical connection is so conceived as to allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6).

2. A system as claimed in claim 1, characterised in that when the groove panel (2) is pressed against the strip panel (1) in said second direction (D2) and is turned angularly away from the strip (6), the maximum distance between the axis of rotation of the groove panel (2) and the locking surface of the locking groove (14) closest to the joint edges is such that the locking element (8) can leave the locking groove (14) without contacting the locking surface of the locking groove (14).

3. A system as claimed in claim 1 or 2, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6) through a height in said first direction that is less than or equal to 2 mm.

4. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection is provided by the joint edge (4) of the groove panel (2) engaging, in said first direction, between the joint edge (3) of the strip panel (1) and the front side of the strip (6).

5. A system as claimed in any one of the preceding claims, characterised in that the strip (6) integrated with the strip panel (1) is made of a material different from that of the strip panel (1) and fixedly mounted on the strip panel (1) at the factory.

6. A system as claimed in claim 5, characterised in that the strip (6), at least for one of the two panels (1, 2), is received in a countersunk

FOI 2005-04-22

groove (40; 42) in the rear side (18; 16) of this one panel (1; 2).

7. A system as claimed in claim 5 or 6, characterised in

5 that the strip (6) is mounted in an equalising groove (40) which is countersunk in the rear side (18) of the strip panel (1) and exhibits an exact, predetermined distance (E) from its bottom to the front side (21) of the strip panel (1),

10 that the part of the strip (6) projecting behind the groove panel (2) engages a corresponding equalising groove (42) which is countersunk in the rear side (16) of the groove panel (2) and which exhibits the same exact, predetermined distance (E) from its bottom to the front  
15 side (26) of the groove panel (2), and

that the strip (6) has at least such a thickness that the rear side (44) of the strip is flush with the rear sides (18, 16) of the panels.

8. A system as claimed in claim 7, characterised  
20 terised in that the strip (6) has such a thickness that it is only partly received in the equalising grooves (40, 42).

9. A system as claimed in any one of claims 5-8, characterised in that the strip (6) is fixed  
25 to the strip panel (1) by means of a mechanical connection.

10. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a gripping edge (52) defined by two recesses (24, 50) in the  
30 rear side (18) of the strip panel, and tongues, lips or the like (54, 56) which are bent or punched from the strip (6) and which press against opposite outer sides of the gripping edge (52).

35 11. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a recess

(58) in the rear side (18) of the strip panel, and tongues, lips or the like (60) which are bent or punched from the strip (6) and which press against opposing inner sides of the recess (58).

5 12. A system as claimed in any one of claims 5-11, characterised in that the strip (6) is fixed to the strip panel (1) by means of a binder.

10 13. A system as claimed in any one of claims 5-12, characterised in that the strip (6) is made of a flexible, preferably resilient material, such as sheet aluminium.

14. A system as claimed in any one of claims 1-4, characterised in that the strip (6) is integrally formed with the strip panel (1), i.e. made in  
15 one piece with the strip panel (1).

15 A system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6).

20 16. A system as claimed in any one of claims 1-14, characterised in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

25 17. A system as claimed in any one of the preceding claims, characterised in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type and a second mechanical connection of the aforementioned  
30 type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type, and a second pair of opposite joint edges (3', 4'),  
35 one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.

18. A system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.

5 19. A system as claimed in claim 18, characterised in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in  
10 said second direction relative to the joint edges (3, 4).

20. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip between the locking element (8) and the joint edge (3)  
15 of the strip panel to seal against the groove panel (2).

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**AWAPATENT**Helsingborg  
23 March 1998Our ref.  
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Sören Giver/MPAttention  
DG 2European Patent Office  
D-802 98 MÜNCHEN  
TYSKLAND**SENT BY FAX 89-2399-4465****VÄLINGE ALUMINIUM AB**  
European Patent Application No.94915725.9-2303

Dear Sirs,

Further to my letter dated 23 February 1998, new claims 1-22 are hereby enclosed in triplicate. The only difference between the new claims hereby submitted and the claims 1-20 submitted by my letter dated 23 February 1998, is that the new claims includes two new dependent claims 21 and 22. No other amendments or additions have been made.

The two new dependent claims 21 and 22 are directed especially to the embodiment and laying sequence illustrated e.g. in Fig 2a-2c, where the two panels during laying are held in mutual contact at the upper part of the adjacent joint edges during the angularly movement. New dependent claim 21 states that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element to enter the locking groove if the groove panel is turned about its joint edge angularly towards the strip while holding the upper part of the joint edge of the groove panel in contact with the upper part of the joint edge of the strip panel. New dependent claim 22 states that the same contact can be maintained also when turning the panel upwards.

The two new dependent claims 21 and 22 are fully supported by the application as filed and, therefore, do not violate Article 123(2) EPC. Especially, support can be found in Figs. 2a-2c and in the corresponding text on page 16, lines 5-22. Reference can be made also to page 9, line 6 ("pressed against"), page 10, lines 7-14 ("...then moving the groove panel with its long side up to the long side...brought into engagement..."), page 13, lines 2-5 ("...the strip panel 2

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of Fig. 1a is pressed with its joint edge against the joint edge 3 of the strip panel 1 and is angled down...", and page 14, lines 6-8 ("...can be taken up in the reverse order...").

If there should be any objections under Article 123(2) EPC on the two new dependent claims, the Examiner is respectfully asked to contact the undersigned as soon as possible.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'S. Geyer'.

Sören Geyer  
Authorized Representative  
AWAPATENT AB

Encl.  
New claims 1-22 in triplicate

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## CLAIMS

1. A system for providing a joint along adjacent joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a first mechanical connection locking the joint edges (3, 4) to each other in a first direction (D1) at right angles to the principal plane of the panels (1, 2), and

- 1) a locking device (6, 8, 14) arranged on the rear side (18, 16) of the panels (1, 2) forms a second mechanical connection locking the panels (1, 2) to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4), said
- 2) locking device (6, 8, 14) comprising a locking groove (14) which extends parallel to and spaced from the joint edge (4) of one (2) of said panels, termed groove panel, and which is open at the rear side (16) of the groove panel (2), c h a r a c t e r i s e d i n
- 2) that the locking device (6, 8, 14) further comprises a strip (6) integrated with the other (1) of said panels, termed strip panel, said strip (6) extending throughout substantially the entire length of the joint edge (3) of the strip panel (1) and being provided with a locking
- 2) element (8) projecting from the strip, such that when the panels are joined together, the strip (6) projects on the rear side of the groove panel (2) with its locking element (8) received in the locking groove (14) of the groove panel (2),
- 3) that the panels, when joined together, can occupy a relative position in said second direction (D2) where a play (Δ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is facing the joint edges and is operative in said second
- 3) mechanical connection,

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that the first and the second mechanical connection both allow mutual displacement of the panels (1, 2) in the direction of the joint edges (3, 4), and

that the second mechanical connection is so conceived as to allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6).

2. A system as claimed in claim 1, characterised in that when the groove panel (2) is pressed against the strip panel (1) in said second direction (D2) and is turned angularly away from the strip (6), the maximum distance between the axis of rotation of the groove panel (2) and the locking surface of the locking groove (14) closest to the joint edges is such that the
- 1) locking element (8) can leave the locking groove (14) without contacting the locking surface of the locking groove (14).

3. A system as claimed in claim 1 or 2, characterised in that the locking surface (10) of the
- 2) locking element (8) is extended from the front side (22) of the strip (6) through a height in said first direction that is less than or equal to 2 mm.

4. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection is provided by the joint edge (4) of the groove panel (2) engaging, in said first direction, between the joint edge (3) of the strip panel (1) and the front side of the strip (6).

5. A system as claimed in any one of the preceding
- 3) claims, characterised in that the strip (6) integrated with the strip panel (1) is made of a material different from that of the strip panel (1) and fixedly mounted on the strip panel (1) at the factory.

6. A system as claimed in claim 5, characterised in that the strip (6), at least for one of
- 35 the two panels (1, 2), is received in a countersunk

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groove (40; 42) in the rear side (18; 16) of this one panel (1; 2).

7. A system as claimed in claim 5 or 6, characterised in

that the strip (6) is mounted in an equalising groove (40) which is countersunk in the rear side (18) of the strip panel (1) and exhibits an exact, predetermined distance (E) from its bottom to the front side (21) of the strip panel (1),

- 1) that the part of the strip (6) projecting behind the groove panel (2) engages a corresponding equalising groove (42) which is countersunk in the rear side (16) of the groove panel (2) and which exhibits the same exact, predetermined distance (E) from its bottom to the front side (26) of the groove panel (2), and

that the strip (6) has at least such a thickness that the rear side (44) of the strip is flush with the rear sides (18, 16) of the panels.

8. A system as claimed in claim 7, characterised in that the strip (6) has such a thickness that it is only partly received in the equalising grooves (40, 42).

9. A system as claimed in any one of claims 5-8, characterised in that the strip (6) is fixed to the strip panel (1) by means of a mechanical connection.

10. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a gripping edge (52) defined by two recesses (24, 50) in the rear side (18) of the strip panel, and tongues, lips or the like (54, 56) which are bent or punched from the strip (6) and which press against opposite outer sides of the gripping edge (52).

11. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a recess

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(58) in the rear side (18) of the strip panel, and tongues, lips or the like (60) which are bent or punched from the strip (6) and which press against opposing inner sides of the recess (58).

12. A system as claimed in any one of claims 5-11, characterised in that the strip (6) is fixed to the strip panel (1) by means of a binder.

13. A system as claimed in any one of claims 5-12, characterised in that the strip (6) is made of  
1) a flexible, preferably resilient material, such as sheet aluminium.

14. A system as claimed in any one of claims 1-4, characterised in that the strip (6) is integrally formed with the strip panel (1), i.e. made in  
1) one piece with the strip panel (1).

15. A system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6).

2) 16. A system as claimed in any one of claims 1-14, characterised in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

17. A system as claimed in any one of the preceding  
2) claims, characterised in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type and a second mechanical connection of the aforementioned  
3) type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type, and a second pair of opposite joint edges (3', 4'),  
3) one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.

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18. A system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.

19. A system as claimed in claim 18, characterised in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in
- 1) said second direction relative to the joint edges (3, 4).

20. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip between the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).
- 1) between the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).

21. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element (8) to enter the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper part of the joint edge (4) of the groove panel (2) in contact with the upper part of the joint edge (3) of the strip panel (1).
- 2) connection are such that they allow the locking element (8) to enter the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper part of the joint edge (4) of the groove panel (2) in contact with the upper part of the joint edge (3) of the strip panel (1).

22. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6) while holding the upper part of the joint edge (4) of the groove panel (2) in contact with the upper part of the joint edge (3) of the strip panel (1).
- 3) (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6) while holding the upper part of the joint edge (4) of the groove panel (2) in contact with the upper part of the joint edge (3) of the strip panel (1).



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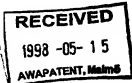
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BY FAX on 08/05/98  
(33 pages in total)



At the attn. of Mr. Giver

FAX-No. 0046 4216 0942

Application No. 94 915 725.9-2303	Ref. 2950767	Date 13.05.98
Applicant VÄLINGE ALUMINIUM AB		

Communication under Rule 51(4) EPC

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

Description, pages:

1-19 as published

Claims, No.:

1-22 as received on 26.03.1998 with letter of 23.03.1998

Drawings, sheets:

1-6 as published

With the following amendments to the above-mentioned documents by the Examining Division:

Description, page: 1

Claims, No.: 21\*, 22\*

Comments:

- \* The amendment to claims 21 and 22 were agreed by telephone with the Agent, Mr Giver, on 31.03.1998, in the interests of clarity.



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Datum/Date

13.05.98

Anm.Nr./Pat. 295076	Anmeldung Nr./Application No./Demande n°/Patent Nr./Brevet n°. 94915725.9-2303
Anmelder/Applicant/Le mandataire/Patentinhaber/Propriétaire/Titulaire VÄLINGE ALUMINIUM AB	

For the intended grant of a European patent, (1) the title of the invention in the three official languages of the European Patent Office, (2) the International Patent Classification and (3) the designated Contracting States and the applicant's registered name, address and country of residence or principal place of business are set out below.

- (1)
- VERBUNDUNGSSYSTEM FÜR GEBÄUDEPLATTEN
  - SYSTEM FOR JOINING BUILDING BOARDS
  - SYSTEME D'ASSEMBLAGE DE PANNEAUX DE CONSTRUCTION
- (2) CLASS STRING: E04F15/14, E04F15/02, E04F13/08
- (3) AT-BE-CH-DE-DK-ES-FR-GB-GR-IL-IT-LI-LU-MC-NL-PT-SE  
 VÄLINGE ALUMINIUM AB  
 Vångavägen 48  
 S-60 40 Viken/SE



A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2056.

You are requested to state your approval of the text specified above **within four months** of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibilities of accelerated prosecution of European patent applications reference is made to OJ EPO 1997, 340.

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 167(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4.

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Idc, F

For the Examining Division

Tel. No.: (089) 2399-2449

Enclosure(s):

Form 2056

3.0 Copies of the relevant documents



SYSTEM FOR JOINING BUILDING BOARDSTechnical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

- 5 More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one panel.

- The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

25

Background of the Invention

- A joint of the aforementioned type is known e.g. from SE/450,141. The first mechanical connection is achieved by means of joint edges having tongues and  
30 grooves. The locking device for the second mechanical connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint

and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful for joining thick floor panels to form surfaces of a considerable expanse.

- Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels employed are laid as "floating floors" without being
- 1) attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in the groove and forcing the floor panels together. The
  - 1) tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board, and a base layer to balance the construction. The core
  - 2) has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall thickness must be at least about 7 mm. These known
  - 2) laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

- First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier
- 3) to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

- Second, the core must be made of moisture-absorbent
- 3) material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the floors thinner using so-called compact laminate, because

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of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

Third, since the laminate layer of the laminated floors is highly wear-resistant, tool wear is a major  
5 problem when working the surface in connection with the formation of the tongue.

Fourth, the strength of the joint, based on a glued tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the  
0 depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in air humidity.

5 Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to every panel on both the long and short sides thereof.

Sixth, it is not possible to disassemble a glued floor once laid, without having to break up the joints.  
10 Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out panels be replaced without extensive efforts, which would  
15 be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

Seventh, known laminated floors are not suited for such use as involves a considerable risk of moisture  
20 penetrating down into the moisture-sensitive core.

Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam or the like, which is to damp impact sounds and to make  
25 the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

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must be placed in edge-to-edge fashion. Different underlays affect the properties of the floor.

There is thus a strongly-felt need to overcome the above-mentioned drawbacks of the prior art. It is however not possible simply to use the known joining technique with glued tongues and grooves for very thin floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is no viable alternative either. Especially, biased clips of this type cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in con-

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nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

- 15 A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

20 A particular object of the invention is to provide a panel-joining system which

- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
- can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
- makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- reduces tool wear when manufacturing floor panels with hard surface layers;

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- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

- 1 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and
- 2 a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

- 3 that the locking device further comprises a strip integrated with the other of said panels, termed strip panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with its locking element received in the locking groove of the groove panel,

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that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

that the second mechanical connection is so conceived as to allow the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip.

The term "rear side" as used above should be considered to comprise any side of the panel located behind/ underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion of the joint edge.

It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can counteract or prevent such displacement and/or upward angling.

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aluminium strip, sufficient strength can be achieved with a strip thickness of the order of 0.5 mm.

- In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of the invention is characterised in that when the groove panel is pressed against the strip panel in the second direction and is turned angularly away from the strip, the maximum distance between the axis of rotation of the groove panel and the locking surface of the locking groove closest to the joint edges is such that the locking element can leave the locking groove without contacting the locking surface of the locking groove. Such a disassembly can be achieved even if the aforementioned play between the locking groove and the locking surface is not greater than 0.2 mm.

- According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

- For optimal function of the invention, the strip and the locking element should be formed on the strip panel with high precision. Especially, the locking surface of the locking element should be located at an exact distance from the joint edge of the strip panel.

- Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

- By known manufacturing methods, it is possible to produce a strip with a locking pin, for example by extruding aluminium or plastics into a suitable section, which is thereafter glued to the floor panel or is inserted in special grooves. These and all other tradi-

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tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the strip panel.

- The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal
- 1) plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.
- 15 Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying
- 2) technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently
- 25 joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

- In connection with their manufacture, the floor
- 3) panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

- The above and other features and advantages of the
- 5 invention will appear from the appended claims and the following description of embodiments of the invention.

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The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

5    Description of Drawing Figures

Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

- 10    Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

- 15    Figs 4a and 4b show a floor panel according to Figs 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

- 20    Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

25    Description of Preferred Embodiments

- Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1
- 30
- 35

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having a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has

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a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action.

As appears from Figs 4a and 4b, each panel in the system has a strip 6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

nection can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

The strip 6 is mounted in a tolerance-equalising groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel 2 has a corresponding tolerance-equalising surface or groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the strip 6 is so chosen that the underside 44 of the strip is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently transmitted to the subfloor 12 without any stresses being exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels. Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.

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- Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24. The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail from below in the perspective view of Fig. 6.
- 1) 2) 3) 4) 5) 6) 7) 8) 9) 10) 11) 12) 13) 14) 15) 16) 17) 18) 19) 20) 21) 22) 23) 24) 25) 26) 27) 28) 29) 30) 31) 32) 33) 34) 35) 36) 37) 38) 39) 40) 41) 42) 43) 44) 45) 46) 47) 48) 49) 50) 51) 52) 53) 54) 55) 56) 57) 58) 59) 60) 61) 62) 63) 64) 65) 66) 67) 68) 69) 70) 71) 72) 73) 74) 75) 76) 77) 78) 79) 80) 81) 82) 83) 84) 85) 86) 87) 88) 89) 90) 91) 92) 93) 94) 95) 96) 97) 98) 99) 100)

- Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.
- 25) 30) 35) 40) 45) 50) 55) 60) 65) 70) 75) 80) 85) 90) 95) 100)
- The embodiment of Figs 2a-c is further characterised in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2

towards the subfloor 12 (Fig. 2b), as well as a portion 36 which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint

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- edges 3, 4 have been brought into complete engagement with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same
- 5 locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it
- 10 possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

- The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips,
- 20 locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber
- 25 strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

- As appears from Fig. 6, an underlay 46, e.g. of
- 30 floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between
- 35 the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip

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panel 1, the projecting part of the strip 6 thus forming an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided

1. directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying

2. can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1.
3. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of panels in all four directions with respect to the initial position.

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## CLAIMS

1. A system for providing a joint along adjacent joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a first mechanical connection locking the joint edges (3, 4) to each other in a first direction (D1) at right angles to the principal plane of the panels (1, 2), and

10 a locking device (6, 8, 14) arranged on the rear side (18, 16) of the panels (1, 2) forms a second mechanical connection locking the panels (1, 2) to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4), said  
15 locking device (6, 8, 14) comprising a locking groove (14) which extends parallel to and spaced from the joint edge (4) of one (2) of said panels, termed groove panel, and which is open at the rear side (16) of the groove panel (2), characterized in

20 that the locking device (6, 8, 14) further comprises a strip (6) integrated with the other (1) of said panels, termed strip panel, said strip (6) extending throughout substantially the entire length of the joint edge (3) of the strip panel (1) and being provided with a locking  
25 element (8) projecting from the strip, such that when the panels are joined together, the strip (6) projects on the rear side of the groove panel (2) with its locking element (8) received in the locking groove (14) of the groove panel (2),

30 that the panels, when joined together, can occupy a relative position in said second direction (D2) where a play (Δ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is facing the joint edges and is operative in said second  
35 mechanical connection,

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that the first and the second mechanical connection both allow mutual displacement of the panels (1, 2) in the direction of the joint edges (3, 4), and

- that the second mechanical connection is so conceived as to allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6).

2. A system as claimed in claim 1, characterised in that when the groove panel (2) is pressed against the strip panel (1) in said second direction (D2) and is turned angularly away from the strip (6), the maximum distance between the axis of rotation of the groove panel (2) and the locking surface of the locking groove (14) closest to the joint edges is such that the locking element (8) can leave the locking groove (14) without contacting the locking surface of the locking groove (14).

3. A system as claimed in claim 1 or 2, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6) through a height in said first direction that is less than or equal to 2 mm.

4. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection is provided by the joint edge (4) of the groove panel (2) engaging, in said first direction, between the joint edge (3) of the strip panel (1) and the front side of the strip (6).

5. A system as claimed in any one of the preceding claims, characterised in that the strip (6) integrated with the strip panel (1) is made of a material different from that of the strip panel (1) and fixedly mounted on the strip panel (1) at the factory.

6. A system as claimed in claim 5, characterised in that the strip (6), at least for one of the two panels (1, 2), is received in a countersunk

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groove (40; 42) in the rear side (18; 16) of this one panel (1; 2).

7. A system as claimed in claim 5 or 6, characterised in

that the strip (6) is mounted in an equalising groove (40) which is countersunk in the rear side (18) of the strip panel (1) and exhibits an exact, predetermined distance (E) from its bottom to the front side (21) of the strip panel (1),

- 1) that the part of the strip (6) projecting behind the groove panel (2) engages a corresponding equalising groove (42) which is countersunk in the rear side (16) of the groove panel (2) and which exhibits the same exact, predetermined distance (E) from its bottom to the front side (26) of the groove panel (2), and

that the strip (6) has at least such a thickness that the rear side (44) of the strip is flush with the rear sides (18, 16) of the panels.

8. A system as claimed in claim 7, characterised in that the strip (6) has such a thickness that it is only partly received in the equalising grooves (40, 42).

9. A system as claimed in any one of claims 5-8, characterised in that the strip (6) is fixed to the strip panel (1) by means of a mechanical connection.

10. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a gripping edge (52) defined by two recesses (24, 50) in the rear side (18) of the strip panel, and tongues, lips or the like (54, 56) which are bent or punched from the strip (6) and which press against opposite outer sides of the gripping edge (52).

11. A system as claimed in claim 9, characterised in that the mechanical connection between the strip (6) and the strip panel (1) comprises a recess

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(58) in the rear side (18) of the strip panel, and tongues, lips or the like (60) which are bent or punched from the strip (6) and which press against opposing inner sides of the recess (58).

12. A system as claimed in any one of claims 5-11, characterised in that the strip (6) is fixed to the strip panel (1) by means of a binder.

13. A system as claimed in any one of claims 5-12, characterised in that the strip (6) is made of  
1) a flexible, preferably resilient material, such as sheet aluminium.

14. A system as claimed in any one of claims 1-4, characterised in that the strip (6) is integrally formed with the strip panel (1), i.e. made in  
1) one piece with the strip panel (1).

15. A system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6).

2) 16. A system as claimed in any one of claims 1-14, characterised in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

17. A system as claimed in any one of the preceding  
2) claims, characterised in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type and a second mechanical connection of the aforementioned  
3) type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type, and a second pair of opposite joint edges (3', 4'),  
3) one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.

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18. A system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.

19. A system as claimed in claim 18, characterised in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in said second direction relative to the joint edges (3, 4).

20. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip between the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).

21. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element (8) to enter the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper <sup>corner</sup> part of the joint edge (4) of the groove panel (2) in contact with the upper <sup>corner</sup> part of the joint edge (3) of the strip panel (1).

22. A system as claimed in any one of the preceding claims, characterised in that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6) while holding the upper <sup>corner</sup> part of the joint edge (4) of the groove panel (2) in contact with the upper <sup>corner</sup> part of the joint edge (3) of the strip panel (1).





Fig. 2a

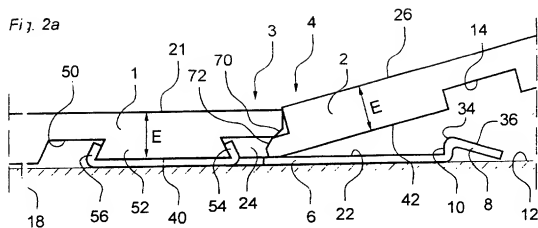


Fig. 2b

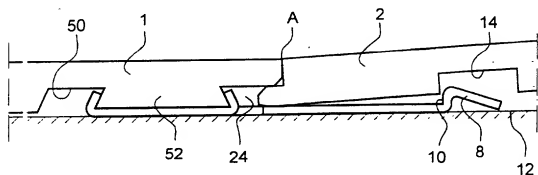


Fig. 2c

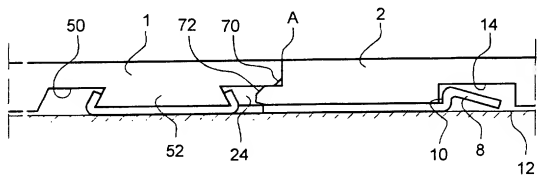


Fig. 3a

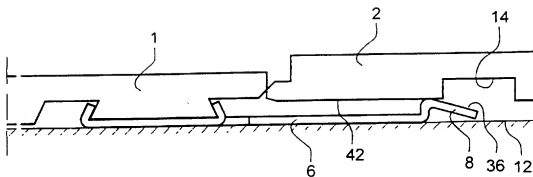


Fig. 3b

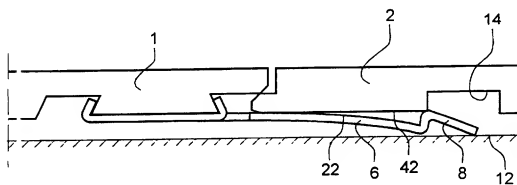


Fig. 3c

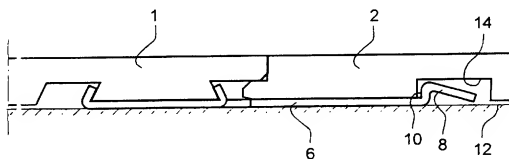


Fig. 4a

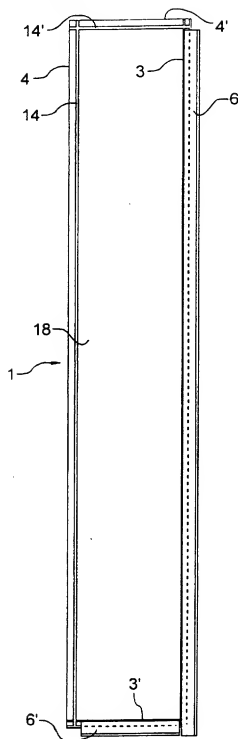
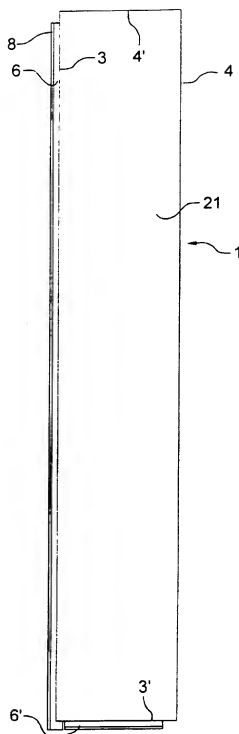
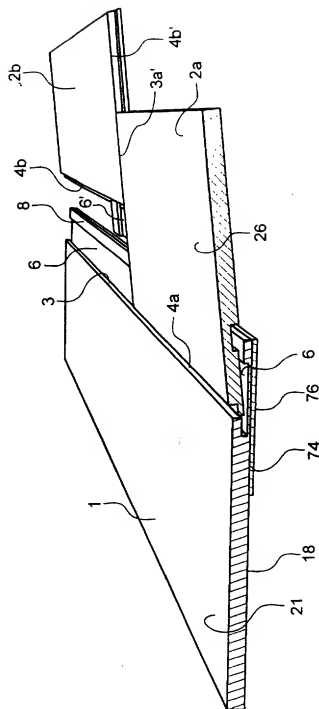


Fig. 4b



5/6

Fig. 5



6/6

Fig. 6

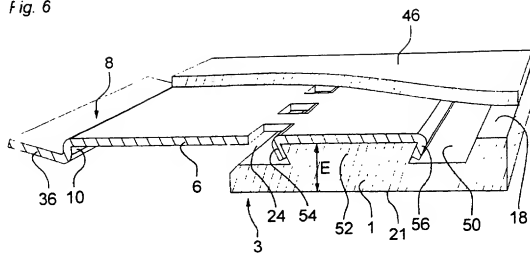
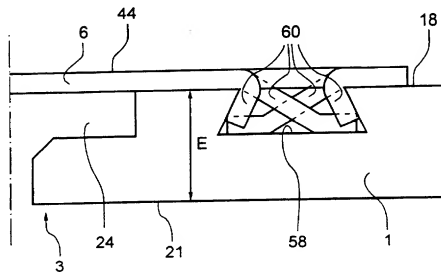


Fig. 7





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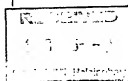
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|   |  |
|---|--|
| sher/Ref./RM.<br>2950767  | Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.<br>94915725.9-2303/0698162 |
| Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire<br>VÄLINGE ALUMINIUM AB |  |

COMMUNICATION PURSUANT TO ARTICLE 115(2) EPC

Please find enclosed observations by a third party concerning the patentability of the invention of the above-mentioned patent application. That person is not a party to the proceedings before the EPO (Art. 115(1) EPC).

Under Article 115(2) EPC you may comment on the observations.

Formalities Officer  
Tel. No. 089/2399 - 2449

Françoise Ide

**BUREAU M.F.J. BOCKSTAEL** NV SA

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D-80298 MÜNCHEN  
DUITSLAND

**COPY**

UN Ref:

ON Ref: A.13586

GV/mb

24 April 1998

Dear Sirs,

re: European patent application No. 94915725.9 (Publ.No. 0.698.162)  
in the name of: VÄLINGE ALUMINIUM AB.

Under art. 115 EPC, we wish to file following observations, regarding  
the above mentioned European patent application.

These observations consist, on the one hand, of a reaction to the  
letter of the representative of VÄLINGE ALUMINIUM AB dated 23 February  
1998, and, on the other hand, of observations relating to art.123 EPC.

\*  
\* \*

Observations regarding the letter dated 23 February 1998.

In his letter of reply, the representative of the applicant tries to  
explain that the wording of claim 1 of the secondary request in fact  
covers the same subject-matter as claim 1 of the main request. This  
means that the representative of the applicant is of the opinion that  
both the embodiments showing a definite play, and the embodiments  
showing no play are covered by claim 1 of the main request.

.1.

to the file on 28.05.98 *fh*

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BELGIAN AND EUROPEAN PATENT ATTORNEYS — BENELUX AND EUROPEAN TRADE MARK ATTORNEYS

BANKEN-BANQUES BBL 320-0007538-42 • KB 409-6513001-77 • CL 610-0023220-31 • PCR-CCP 000-0278395-05 • HRA/RCA 25 541 • BTW/TVA BE 400.526.955

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Furthermore, we would also like to draw the attention of the Examiner to the fact that, as explained further on, there is a clear difference between the expressions "integrated" and "integrally", and that the statement of the representative of the applicant on page 3, second paragraph, in which it is said that "integrated" means either fixedly connected to the panel, or integrally formed with the panel, is not correct.

Regarding the possibility to mutually displace coupled boards in the direction of the joint edges (see second full paragraph on page 3 of the representative's letter dated 23 February 1998), it should be noted that such feature is clearly disclosed in GB 1.430.423, page 3 lines 10-15. Hereby it should also be noted that the joint structure shown in GB 1.430.423, apart from the fact that no separate strip and no play are used, is identical to the joint structure proposed in EP 0.698.162. This is very clear when turning figure 2 of GB 1.430.423 upside down.

Regarding the joint structure disclosed in GB 1.430.423, it is clear that this structure also provides in a locking action in two directions. This is described word for word on page 2, lines 105-113.

Important is also to note that the members 10 and 11 of GB 1.430.423 can be released again, as described on page 2, lines 29-31. It is obvious that to release the members 10 and 11 from each other, this will also be done by turning one member angularly away from the other panel, similar as disclosed in the last paragraph of claim 1 of the secondary request.

\*  
\* \* \*

Observations relating to art. 84 EPC and art.123 EPC.

Claim 14 is added during the proceedings and claims that the strip 6 is integrally formed with the strip panel 8, i.e. made in one piece with the strip panel 1.

This claim 14 depends on claims 1-4.

We would like to draw the attention of the Examiner to the fact that the embodiment in which the strip 6 is integrally formed with the strip panel 8 is described in conjunction with the use of the separate strip 74 (see description page 17, line 36 to page 18, line 17, as well as figure 5).

The description does not comprise a clear indication that the invention also relates to panels, having a strip 6 which is integrally formed with the panel, and in which the strip 74 is omitted. Consequently, present claim 14, as being dependent on claims 1-4, relates to subject-matter which extends beyond the content of the application as filed, and therefore in our opinion does not comply with art.123 EPC.

In fact claim 14 was added after the applicant noticed that competitors were manufacturing flooring panels having a strip portion which is formed in one piece with the panel and which were not provided with the strip 74.

Moreover, with respect to the above said, we also would like to draw the attention of the Examiner to the fact that the main object of the invention described in EP 0.698.162 substantially consists in providing a system for joining together building panels whereby the strength of the joint is no longer limited by the strength of the material of the panel itself or, vice versa, whereby the minimum thickness of the panel is no longer limited by requirements necessary to realise coupling portions at the edges (see objects and problems to be solved described in the introduction of the application, for instance page 4, lines 3-10 and page 5, lines 14-199). In other words EP 0.698.162 aims a solution to the problem that connections by means of a normal tongue and groove connection provided in the panel itself are not sufficiently strong and in certain applications impossible to produce.

According to the solution proposed in EP 0.698.162 this problem is solved either by using a separate strip 6 fixed to the panel, or by using a strip 6 which is in one piece with the panel but which in that case is provided with an additional strip 74. These strips 6-74 provide in a strong coupling portion.

It is clear that if in the embodiment of figure 5 the strip 74 is omitted, the posed problem is no longer solved. Consequently, also for this reason, an embodiment similar to the one in figure 5 but without the strip 74 is in our opinion not within the content of the application as filed.

In fact the strip 74 in the embodiment of figure 5 is provided to solve the same problems as these which are solved with the strip 6 in the other shown embodiments (this is clear from the description, especially from lines 7 to 9 on page 18, in which it is stated that the strip 74

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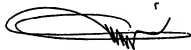
has "a width covering approximately the same surface as the separate strip 6 of the previous embodiments"). When the strip 74 is omitted, said problems are no longer solved, and the resulting embodiments are no longer within the scope of the invention.

Furthermore, added claim 14 is in our opinion not clear (art. 84 EPC) as the subject-matter of claim 14 is in contradiction with the subject-matter of claim 1 from which it depends. In claim 1 it is stated that the strip 6 is "integrated" with the panel, which means that the strip 6 consists of a separate element fixed to the panel (according to the Webster's dictionary "integrated" means "composed of separate parts united together to form a more complete entity"). In the added claim 14, it is said that the strip is "integrally" formed with the panel, which according to the applicant means that it is made in one piece. In our opinion, the term "integrally" is opposite to "integrated", and therefore claim 14 is not clear in that it refers to claims 1 to 4.

\*  
\* \*

It is respectfully requested that the Examiner handling the European patent application No. 94915725.9 should take in consideration the above formulated observations.

Yours faithfully.



E. Donn  M. Sc.  
European Patent Attorney

**AWAPATENT**Handled by  
Sören Giver/MPHelsingborg  
3 July 1998Attention  
DG 2Our ref.  
2950767European Patent Office  
D-80298 MÜNCHEN**REGISTERED LETTER****SENT BY FAX +89 2399-4465**Applicant(s): VÄLINGE ALUMINIUM AB  
European Patent Application No. 94915725.9-2303  
Response to Communication under Rule 51(4) EPC

Dear Sirs,

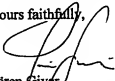
This is to inform you that I approve of the text specified in the Communication of 13 May 1998.

Furthermore, I request that the patent be granted immediately in accordance with A 97(6) EPC, and the PACE-programme.

For this purpose, I enclose

- a debit order concerning the fee for grant and printing and claim fees for claims 20-22..
- translations into French and German of the approved claims; and
- a translation of the priority application (R 38(4))

Yours faithfully,

  
Sören Giver,  
Authorised Representative  
AWAPATENT AB

HELSINGBORG

VAT No. SE556082702301

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**SENT BY REGISTERED MAIL**European Patent Application No. 94915725.9-2303  
International Application (IA-PCT) No. PCT/SE94/00386  
Applicant(s): VÄLINGE ALUMINIUM AB

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**AWAPATENT AB****Please return the enclosed  
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 Sören Giver

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VAT No.

SE556082702301

### Patentansprüche

1. Ein System zur Bereitstellung einer Verbindung entlang angrenzender Verbindungskanten (3, 4) zweier Gebäudeplatten (1, 2), insbesondere Bodenplatten, wobei bei der Verbindung:

zwei angrenzende Verbindungskanten (3, 4) zusammen eine erste, mechanische Verbindung bilden, die die Verbindungskanten (3, 4) aneinander in einer ersten Richtung (D1) unter rechten Winkeln zu der Hauptebene der Platten (1, 2) verriegelt, und

eine auf der Rückseite (18, 16) der Platten (1, 2) angeordnete Verriegelungseinrichtung (6, 8, 14) eine zweite mechanische Verbindung bildet, die die Platten (1, 2) miteinander in einer zweiten Richtung (D2) parallel zu der Hauptebene und unter rechten Winkeln zu den Verbindungskanten (3, 4) verriegelt, wobei die genannte Verriegelungseinrichtung (6, 8, 14) eine Verriegelungsnut (14) umfaßt, die sich parallel zu und von der Verbindungskante (4) einer (2) der genannten Platten, Nutenplatte genannt, beabstandet erstreckt und die auf der Rückseite (16) der Nutenplatte (2) offen ist, dadurch gekennzeichnet,

daß die Verriegelungseinrichtung (6, 8, 14) des weiteren einen Streifen (6) umfaßt, der mit der anderen (1) der genannten Platten, Streifenplatte genannt, integriert ist, wobei sich der genannte Streifen (6) im wesentlichen über die gesamte Länge der Verbindungskante (3) der Streifenplatte (1) erstreckt und mit einem Verriegelungselement (8) versehen ist, das von dem Streifen so hervorsteht, daß, wenn die Platten miteinander verbunden sind, der Streifen (6) auf der Rückseite der Nutenplatte (2) hervorsteht, wobei sein Verriegelungselement (8) in der Verriegelungsnut (14) der Nutenplatte (2) aufgenommen ist,

daß die Platten, wenn sie miteinander verbunden sind, eine relative Position in der genannten zweiten Richtung (D2) einnehmen können, wo ein Spiel ( $\Delta$ ) zwischen der Verriegelungsnut (14) und einer Verriegelungsoberfläche (10) an dem Verriegelungselement (8) vorhanden ist, die zu den verbundenen Kanten weist und bei der genannten zweiten, mechanischen Verbindung wirksam ist,

daß die erste und zweite, mechanische Verbindung beide eine gegenseitige Verschiebung der Platten (1, 2) in der Richtung der Verbindungskanten (3, 4) erlauben, und

daß die zweite, mechanische Verbindung so geplant ist, daß sie dem Verriegelungselement (8) erlaubt, die Verriegelungsnut (14) zu verlassen, wenn die Nutenplatte (2) um ihre Verbindungskante (4) winkelmäßig von dem Streifen (6) fort herumgedreht wird.

2. Ein System, wie in Anspruch 1 beansprucht, **dadurch gekennzeichnet**, daß, wenn die Nutenplatte (2) gegen die Streifenplatte (1) in der genannten zweiten Richtung (D2) gedrückt wird und winkelmäßig von dem Streifen (6) fort herumgedreht wird, der maximale Abstand zwischen der Drehachse der Nutenplatte (2) und der Verriegelungsoberfläche der den Verbindungskanten am nächsten Verriegelungsnut (14) derart ist, daß das Verriegelungselement (8) die Verriegelungsnut (14) verlassen kann, ohne die Verriegelungsoberfläche der Verriegelungsnut (14) zu berühren.
3. Ein System, wie in Anspruch 1 oder 2 beansprucht, **dadurch gekennzeichnet**, daß die Verriegelungsoberfläche (10) des Verriegelungselements (8) von der Vorderseite (22) des Streifens (6) über eine Höhe in der genannten ersten Richtung fortgesetzt ist, die kleiner als oder gleich 2 mm ist.
4. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die erste, mechanische Verbindung von der Verbindungskante (4) der Nutenplatte (2) bereitgestellt wird, die in der genannten

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ersten Richtung zwischen der Verbindungskante (3) der Streifenplatte (1) und der Vorderseite des Streifens (6) eingreift.

5. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß der mit der Streifenplatte (1) integrierte Streifen (6) aus einem Material hergestellt ist, das von dem der Streifenplatte (1) verschieden ist, und fest an der Streifenplatte (1) in der Fabrik befestigt worden ist.
6. Ein System, wie in Anspruch 5 beansprucht, **dadurch gekennzeichnet**, daß zumindest für eine der zwei Platten (1, 2) der Streifen (6) in einer versenkten Nut (40; 42) in der Rückseite (18; 16) dieser einen Platte (1; 2) aufgenommen wird.
7. Ein System, wie in Anspruch 5 oder 6 beansprucht, **dadurch gekennzeichnet**,  
  
daß der Streifen (6) in einer Ausgleichsnut (40) angebracht ist, die in der Rückseite (18) der Streifenplatte (1) versenkt ist und einen genauen, vorbestimmten Abstand (E) von ihrem Boden zu der Vorderseite (21) der Streifenplatte (1) aufweist,  
  
daß der Teil des Streifens (6), der hinter der Nutenplatte (2) hervorsteht, in eine entsprechende Ausgleichsnut (42) eingreift, die in der Rückseite (16) der Nutenplatte (2) versenkt ist und den gleichen genauen, vorbestimmten Abstand (E) von ihrem Boden zu der Vorderseite (26) der Nutenplatte (2) aufweist, und  
  
daß der Streifen (6) zumindest eine solche Dicke aufweist, daß die Rückseite (44) des Streifens plan mit den Rückseiten (18, 16) der Platten ist.
8. Ein System, wie in Anspruch 7 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) eine solche Dicke aufweist, daß er nur teilweise in den Ausgleichsnuten (40, 42) aufgenommen ist.

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9. Ein System, wie in irgendeinem der Ansprüche 5-8 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) an der Streifenplatte (1) mittels einer mechanischen Verbindung befestigt ist.
10. Ein System, wie in Anspruch 9 beansprucht, **dadurch gekennzeichnet**, daß die mechanische Verbindung zwischen dem Streifen (6) und der Streifenplatte (1) eine Greifkante (52), die durch zwei Vertiefungen (24, 50) in der Rückseite (18) der Streifenplatte begrenzt ist, und Zungen, Lippen oder Ähnliches (54, 56) umfaßt, die von dem Streifen (6) gebogen oder ausgestanzt sind und gegen gegenüberliegende Außenseiten der Greifkante (52) drücken.
11. Ein System, wie in Anspruch 9 beansprucht, **dadurch gekennzeichnet**, daß die mechanische Verbindung zwischen dem Streifen (6) und der Streifenplatte (1) eine Vertiefung (58) in der Rückseite (18) der Streifenplatte und Zungen, Lippen oder Ähnliches (60) umfaßt, die von dem Streifen (6) gebogen oder ausgestanzt sind und die gegen gegenüberliegende Innenseiten der Vertiefung (58) drücken.
12. Ein System, wie in irgendeinem der Ansprüche 5-11 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) an der Streifenplatte (1) mittels eines Binders befestigt ist.
13. Ein System, wie in irgendeinem der Ansprüche 5-12 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) aus einem flexiblen, vorzugsweise elastischen Material hergestellt ist, wie Aluminiumblech.
14. Ein System, wie in irgendeinem der Ansprüche 1-4 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) einstückig mit der Streifenplatte (1) gebildet ist, d.h. als ein Stück mit der Streifenplatte (1) hergestellt ist.
15. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß das Verriegelungselement (8) aus einer Verriegelungskante besteht, die sich fortlaufend entlang dem Streifen (6) erstreckt.

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16. Ein System, wie in irgendeinem der Ansprüche 1-14 beansprucht, **dadurch gekennzeichnet**, daß das Verriegelungselement (8) aus einer Mehrzahl beabstandeter Verriegelungselemente besteht, die über die Länge des Streifens (6) verteilt sind.
17. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die Platten (1, 2) rechteckig sind und an jeder ihrer vier Kanten (3, 4, 3', 4') mit einer ähnlichen Platte durch eine erste, mechanische Verbindung der vorgenannten Art und eine zweite, mechanische Verbindung der vorgenannten Art verbunden werden sollen, wobei jede Platte ein erstes Paar gegenüberliegender Verbindungskanten (3, 4), von denen eine mit einem Streifen (6) der vorgenannten Art versehen ist und die andere mit einer Verriegelungsnut (14) der vorgenannten Art versehen ist, und ein zweites Paar gegenüberliegender Verbindungskanten (3', 4') aufweist, von denen eine mit einem Streifen (6') der vorgenannten Art versehen ist und die andere mit einer Verriegelungsnut (14') der vorgenannten Art versehen ist.
18. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß eine Unterlage (46) aus Bodenbreitern, Schaumstoff, Filz oder Ähnlichem an den Rückseiten (18, 16) der Platten befestigt ist.
19. Ein System, wie in Anspruch 18 beansprucht, **dadurch gekennzeichnet**, daß die Unterlage (16) so befestigt ist, daß sie den Streifen (6) in der genannten zweiten Richtung wenigstens bis zu dem Verriegelungselement (8) überdeckt, so daß eine Verbindung zwischen den Unterlagen (46) zweier angrenzender Platten in der genannten zweiten Richtung in bezug auf die Verbindungskanten (3, 4) versetzt ist.
20. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß eine Dichtungseinrichtung, wie eine Dichtmasse, ein Gummistreifen oder Ähnliches, auf der Vorderseite (22) des Streifens zwischen dem Verriegelungselement (8) und der Verbindungskante (3) der Streifenplatte vorgesehen ist, um gegenüber der Nutenplatte (2) abzudichten.

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21. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die erste, mechanische Verbindung sowie die zweite, mechanische Verbindung derart sind, daß sie dem Verriegelungselement (8) erlauben, in die Verriegelungsnut (14) einzutreten, wenn die Nutenplatte (2) um ihre Verbindungskante (4) winkelmäßig in Richtung zu dem Streifen (6) herumgedreht wird, während der obere Eckteil der Verbindungskante (4) der Nutenplatte (2) mit dem oberen Eckteil der Verbindungskante (3) der Streifenplatte (1) in Berührung gehalten wird.
22. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die erste, mechanische Verbindung sowie die zweite, mechanische Verbindung derart sind, daß sie dem Verriegelungselement (8) erlauben, die Verriegelungsnut (14) zu verlassen, wenn die Nutenplatte (2) um ihre Verbindungskante (4) winkelmäßig von dem Streifen (6) fort herumgedreht wird, während der obere Eckteil der Verbindungskante (4) der Nutenplatte (2) mit dem oberen Eckteil der Verbindungskante (3) der Streifenplatte (1) in Berührung gehalten wird.

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# REVENDECATIONS

1. Système de formation d'un joint le long de bords adjacents (3, 4) de joint de deux panneaux de construction (1, 2), notamment de panneaux de sol, le joint étant tel que :
  - 5 les bords adjacents (3, 4) de joint forment ensemble une première connexion mécanique qui bloque les bords (3, 4) de joint l'un par rapport à l'autre dans une première direction (D1) qui est perpendiculaire au plan principal des panneaux (1, 2), et
  - 10 un dispositif de blocage (6, 8, 14) placé à la face arrière (18, 16) des panneaux (1, 2) forme une seconde connexion mécanique bloquant les panneaux (1, 2) l'un par rapport à l'autre dans une seconde direction (D2) parallèle au plan principal et perpendiculaire aux bords (3, 4) de joint,
  - 15 le dispositif de blocage (6, 8, 14) comprenant une gorge de blocage (14) qui s'étend parallèlement au bord de joint (4) de l'un (2) des panneaux appelé panneau à gorge, et à distance de ce bord, et qui est ouverte à la face arrière (16) du panneau à gorge (2), caractérisé en ce que
  - 20 le dispositif de blocage (6, 8, 14) comporte en outre une bande (6) intégrée à l'autre (1) des panneaux, appelé panneau à bande, la bande (6) s'étendant pratiquement sur toute la longueur du bord (3) de joint du panneau à bande (1) et ayant un élément de blocage (8) qui dépasse de la bande si
  - 25 bien que, lorsque les panneaux sont raccordés, la bande (6) dépasse à la face arrière du panneau à gorge (2) avec son élément de blocage (8) logé dans la gorge de blocage (14) du panneau à gorge (2),
  - 30 les panneaux, lorsqu'ils sont raccordés, peuvent occuper une position relative dans la seconde direction (D2) telle qu'il existe un jeu (D) entre la gorge de

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blocage (14) et une surface de blocage (10) formée sur l'élément de blocage (8) qui est tournée vers les bords de joint et qui travaille dans la seconde connexion mécanique,

5 la première et la seconde connexion mécanique permettent toutes deux un déplacement mutuel des panneaux (1, 2) dans la direction des bords (3, 4) de joint, et

la seconde connexion mécanique est réalisée afin qu'elle permette à l'élément de blocage (8) de quitter la gorge de blocage (14) lorsque le panneau à gorge (2) est tourné autour de son bord de joint (4) angulairement en s'écartant de la bande (6).

2. Système selon la revendication 1, caractérisé en ce que, lorsque le panneau à gorge (2) est repoussé contre le panneau à bande (1) dans la seconde direction (D2) et est tourné angulairement en s'écartant de la bande (6), la distance maximale entre l'axe de rotation du panneau à gorge (2) et la surface de blocage de la gorge de blocage (14) la plus proche des bords de joint est telle que l'élément de blocage (8) peut quitter la gorge de blocage (14) sans être au contact de la surface de blocage de la gorge de blocage (14).

3. Système selon la revendication 1 ou 2, caractérisé en ce que la surface de blocage (10) de l'élément de blocage (8) s'étend depuis la face avant (22) de la bande (6) sur une hauteur dans la première direction qui est inférieure ou égale à 2 mm.

4. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que la première connexion mécanique est formée par le fait que le bord de joint (4) du panneau à gorge (2) est en prise, dans la première direction, entre le bord de joint (3) du panneau à bande (1) et la face avant de la bande (6).

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5. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que la bande (6) intégrée au panneau à bande (1) est formée d'un matériau différent de celui du panneau à bande (1) et est montée à demeure sur le panneau à bande (1) en usine.

6. Système selon la revendication 5, caractérisé en ce que la bande (6), au moins pour l'un des deux panneaux (1, 2), est logée dans une gorge fraisée (40 ; 42) formée à la face arrière (18, 16) du premier panneau (1 ; 2).

7. Système selon la revendication 5 ou 6, caractérisé en ce que

la bande (6) est montée dans une gorge d'égalisation (40) qui est fraisée à la face arrière (18) du panneau à bande (1) et présente une distance prédéterminée exacte (E) de son fond à la face avant (21) du panneau à bande (1),

la partie de la bande (6) qui dépasse derrière le panneau à gorge (2) coopère avec une gorge correspondante d'égalisation (42) qui est fraisée à la face arrière (16) du panneau à gorge (2) et qui présente la même distance exacte prédéterminée (E) de son fond à la face avant (26) du panneau à gorge (2), et

la bande (6) a au moins une épaisseur telle que la face arrière (44) de la bande se trouve au niveau des côtés arrière (18, 16) des panneaux.

8. Système selon la revendication 7, caractérisé en ce que la bande (6) a une épaisseur telle qu'elle ne se loge que partiellement dans les gorges d'égalisation (40, 42).

9. Système selon l'une quelconque des revendications 5 à 8, caractérisé en ce que la bande (6) est fixée au panneau à bande (1) par une connexion mécanique.

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10. Système selon la revendication 9, caractérisé en ce que la connexion mécanique formée entre la bande (6) et le panneau à bande (1) comporte un bord de saisie (52) délimité par deux cavités (24, 50) à la face arrière (18) du panneau à bande, et des languettes, des lèvres ou analogues (54, 56) qui sont courbées ou poinçonnées dans la bande (6) et qui exercent une pression contre les côtés externes opposés du bord de saisie (52).

11. Système selon la revendication 9, caractérisé en ce que la connexion mécanique entre la bande (6) et le panneau à bande (1) comporte une cavité (58) formée à la face arrière (18) du panneau à bande, et des languettes, lèvres ou analogues (60) qui sont courbées ou poinçonnées dans la bande (6) et qui exercent une pression contre les côtés internes opposés de la cavité (58).

12. Système selon l'une quelconque des revendications 5 à 11, caractérisé en ce que la bande (6) est fixée au panneau à bande (1) par un liant.

13. Système selon l'une quelconque des revendications 5 à 12, caractérisé en ce que la bande (6) est formée d'un matériau souple, de préférence élastique, tel qu'une feuille d'aluminium.

14. Système selon l'une quelconque des revendications 1 à 4, caractérisé en ce que la bande (6) est formée solidairement avec le panneau à bande (1), c'est-à-dire en une seule pièce avec le panneau à bande (1).

15. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que l'élément de blocage (8) est constitué d'un bord de blocage qui s'étend de façon continue le long de la bande (6).

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16. Système selon l'une quelconque des revendications 1 à 14, caractérisé en ce que l'élément de blocage (8) est constitué de plusieurs éléments espacés de blocage répartis sur toute la longueur de la bande (6).

17. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que les panneaux (1, 2) sont rectangulaires et sont destinés, à chacun de leurs quatre bords (3, 4, 3', 4'), à être raccordés à un panneau analogue par une première connexion mécanique du type précité et une seconde connexion mécanique du type précité, chaque panneau ayant une première paire de bords opposés de joint (3, 4) dont l'un a une bande (6) du type précité et l'autre a une gorge de blocage (14) du type précité, et une seconde paire de bords opposés de joint (3', 4') dont l'un a une bande (6') du type précité et l'autre a une gorge de blocage (14') du type précité.

18. Système selon l'une quelconque des revendications précédentes, caractérisé en ce qu'une sous-couche (46) de panneaux de sol, de mousse, de feutre ou analogue est fixée aux faces arrière (18, 16) des panneaux.

19. Système selon la revendication 18, caractérisé en ce que la sous-couche (46) est fixée afin qu'elle couvre la bande (6) dans la seconde direction au moins jusqu'à l'élément de blocage (8), si bien qu'un joint formé entre les sous-couches (46) des deux panneaux adjacents est décalé dans la seconde direction par rapport aux bords de joint (3, 4).

20. Système selon l'une quelconque des revendications précédentes, caractérisé en ce qu'un dispositif d'étanchéité, tel qu'une composition

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d'étanchéité, une bande de caoutchouc ou analogue, est placée à la face avant (22) de la bande entre l'élément de blocage (8) et le bord de joint (3) du panneau à bande afin que l'étanchéité soit assurée contre le panneau à gorge (2).

21. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que la première connexion mécanique et la seconde connexion mécanique sont telles qu'elles permettent à l'élément de blocage (8) de pénétrer dans la gorge de blocage (14) lorsque le panneau à gorge (2) est tourné angulairement autour de son bord de joint (4) vers la bande (6) avec retenue de la partie supérieure de coin du bord de joint (4) du panneau à gorge (2) au contact de la partie supérieure de coin du bord de joint (3) du panneau à bande (1).

22. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que la première connexion mécanique et la seconde connexion mécanique sont telles qu'elles permettent à l'élément de blocage (8) de quitter la gorge de blocage (14) lorsque le panneau à gorge (2) est tourné angulairement autour de son bord de joint (4) en s'écartant de la bande (6) avec retenue de la partie supérieure de coin du bord de joint (4) du panneau à gorge (2) au contact de la partie supérieure de coin du bord de joint (3) du panneau à bande (1).

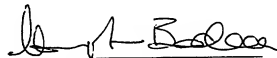
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# THE EUROPEAN PATENT OFFICE

## Declaration

I, the undersigned Margareta Backen, technical translator, of Bellevuevägen 46, Malmö, Sweden, do hereby declare that I am conversant with the English and Swedish languages and am a competent translator thereof, and I further declare that to the best of my knowledge and belief the following is a true and complete translation made by me of the Swedish Patent Application No. 9301595-6 filed on the 10th of May 1993 by Tony Perván, Solna, Sweden. Having been duly assigned, this application is now being prosecuted by Vålinge Aluminium AB, Viken, Sweden.

Signed this 16th day of October 1995



Margareta Backen



**THE SWEDISH PATENT  
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### Certificate

*This is to certify that the annexed documents are true copies of the documents originally filed with the Swedish Patent and Registration Office in the following Application.*

(Seal of  
the Patent  
Office)

*Applicant(s)*

*Tony Perván, Solna SE*

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## JOINING OF THIN FLOATING HARD FLOORS

The present invention relates to joining methods for thin floating hard floors by means of glue, double-adhesive tape and mechanical locking, consisting of grooves ground in the underside of the floor panels and a loose strip which permit rapid, concealed, floating, exact and highly resistant joining of thin floor panels independently of the thickness tolerances of the floor panels.

1.)

## Background of the Invention

Laminated floors have in a short time taken a substantial share of the market for renovation floors. All thin lami-

- 1.) nated floors which are laid as "floating floors" without being attached to the supporting structure, consist of a surface layer of decorated laminate, a carrier of fibre-board or particle board and a balance layer of laminate or impregnated paper. The floor panels are as a rule
- 2.) 200 \* 1200 mm, and their long and short sides are formed with tongues and grooves. The floor is laid by applying glue in the groove and forcing the floor panels together (see Fig. 1).

- 2.) The laminate consisting of a decorative wear layer of melamine and a core of phenol has very good properties in respect of wear resistance, impact strength and water resistance. The weak point of the floor is the carrier of particle board, which has essentially poorer properties than the laminate, but is needed for stability and, above all, to make it possible to provide a tongue-and-groove joint. This restricts the thickness to at least 7 mm. Thinner floors have the advantage that in renovation, it is possible to cope with low thresholds and

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there is no need of planing the doors. The method of laying the floor is also complicated and time-consuming since glue must be applied in every groove.

- 5 The above-mentioned disadvantages can be overcome by removing the carrier and increasing the laminate thickness by some suitable modification of the phenol core. Such a compact laminate has even at a thickness of 3 mm better properties than the present laminated floors.
- 10 Laying would be facilitated to a great extent if double-adhesive tape or mechanical locking could be used. The problem is that none of the joining methods available today can be applied to floating floors of such small thickness. Grooves and tongues and strips inserted into
- 15 the material cannot be used in thin materials and especially not together with double-adhesive tape.

A further problem is that compact laminates must be composed symmetrically, i.e. the upper and the lower side

20 should consist of similar thermosetting resins and fibres to make the laminated panels flat. In connection with manufacture, the laminated panels will have a thickness tolerance of about  $\pm 0.2$ - $0.3$  mm. The panels cannot have uniform thickness by grinding of the rear side since this

25 destroys the symmetrical design, resulting in bulging. Panels of different thicknesses mean that the joint edge will be subjected to very high loads if formed in a traditional manner.

- 30 Double-adhesive tape is a very convenient adhering method in many contexts, but the problem is that it catches directly and does not allow the material to be adjusted as is the case in ordinary gluing, in which it is possible, after applying glue in the groove, to first press the groove and tongue together at the long side and subsequently displace the floor panel along the long side
- 35 such that also the tongue and groove at the short side

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engage with each other, whereupon the glue hardens. A further problem is that a large laying surface and relatively high initial pressure are required to provide joints of high strength. With a large laying surface it is possible to cope with high loads in the shearing direction along the tape, whereas the release strength perpendicular to the tape is considerably lower. Since there is a risk of the floor panels bulging owing to uneven air humidity, it should be aimed at designing the joint such that the release forces are converted into shearing forces. Double-adhesive tape does not function in the joining methods that are used today for floating joints.

1. The problem of mechanical locking is that it is difficult to achieve sufficient strength in thin constructions and to provide locking of both long sides and short sides. Since it must be possible to cut the floor panels with a handsaw, the joint is not allowed to contain hard materials.
2. There are today no joining methods for floating joints, which are based on mechanical locking of all sides.

#### Object of the Invention and Main Characteristics

2. The object of the invention is to provide methods for joining thin floating floor panels of different thicknesses, which permit the floor panels to be laid with smooth surface joints, the strength in the joint to be high and joining to be carried out with glue, double-adhesive tape and mechanical locking. This object is achieved by grooves being ground in the underside of the long and short sides of the floor panels such that the distance from the surface of the floor panels to the upper part of the groove has a constant dimension which is slightly smaller than the minimum thickness of the floor panels. The groove eliminates thickness tolerances
- 3.
- 35.

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- and permits a strip of laminate, plastic or aluminium having a thickness slightly greater than the difference between the thinnest and the thickest floor panel and a width corresponding to twice the groove width, coated
- 5 with glue or double-adhesive strip, to be attached to the underside of one floor panel such that half the strip width projects beyond the joint edge, and the other floor panel can be laid in position on the projecting part of the strip edge-to-edge with the first-mentioned floor
- 10 panel, and the floor panels always rest in the joint on the strip which takes up all the load to which the joint is subjected and which transfers the vertical forces to the existing subfloor. The upper part of the joint is completely flat independently of the thickness tolerance
- 15 of the floor panels, and the floor floats without being attached to the supporting structure. By a suitable design of grooves, strips and joint edges on the long and short sides of the floor panels, the floor panels can be laid by means of glue, double-adhesive tape and mechanical locking.
- 20

#### Description of Drawings

Fig. 1 shows the design of existing laminated floors.

2;

Fig. 2 shows the joining of thin floating hard floors by means of glue and double-adhesive tape.

- Fig. 3 shows the joining of thin floating hard floors by means of glue and double-adhesive tape, joint edges being bevelled for transferring lifting forces into shearing forces.
- 3)

- Fig. 4 shows the joining of thin floating hard floors by means of glue and double-adhesive tape, grooves being milled in joint edges for mechanical locking of upward motion.
- 3;

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Fig. 5 shows the joining of thin floating hard floors by mechanical locking in all directions.

5 Description of Embodiments

- In the drawings, Figs 2-5, a floor panel having a minimum thickness is designated 1, a floor panel having a maximum thickness is designated 2, grooves ground in the under-  
10 side of a floor panel is designated 3, a strip of laminate, plastic or aluminium is designated 4, a glue layer is designated 5, the surface of the floor panels is designated 6, obliquely sawn joint edges are designated 7, a milled groove in the underside of a joint edge is  
15 designated 8, a milled groove in the upper side of a joint edge is designated 9, a locking pin on a strip is designated 10, a locking groove in the underside of a floor panel is designated 11, a bevelled edge of a locking pin is designated 12 and the existing subfloor is  
20 designated 13.

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## CLAIMS

1. Joining of thin floating hard floors, consisting of grooves (3), a strip (4) and a glue layer of double-adhesive tape or glue (5),  
*characterised in that*  
grooves (3) are provided on the underside of the long and short sides of the floor panels such that the distance  
10 from the surface (6) of the floor panels to the groove always keeps a constant measure which is slightly smaller than the minimum thickness of the floor panels, wherein a strip (4) with a glue layer (5) and a width corresponding to twice the groove width and a thickness including the  
15 glued layer slightly greater than the maximum difference between the thinnest (1) floor panel and the thickest (2) floor panel is glued on the underside of one floor panel (2) such that half the strip width, which is coated with glue or double-adhesive tape, projects, on which the  
20 other floor panel (1), when laying the floor, is laid edge-to-edge such that both floor panels in the joint rest merely on the strip.
2. An arrangement according to claim 1,  
25 *characterised in that*  
the joint edges (7) of said floor panels are obliquely sawn such that one floor panel (1) when being laid is inserted under the other floor panel (2) such that a horizontal motion is required to make said floor panel  
30 (1) come loose from the double-adhesive tape and rise from the strip (4).
3. The arrangement according to claim 1,  
*characterised in that*  
35 on the joint edge (8) of one floor panel (2) a recess is made on the underside and on the joint edge (9) of the

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other floor panel (1) a recess is made on the upper side such that one floor panel (1) when being laid can be inserted under the other floor panel (2) in such a manner that mechanical locking against lifting forces arises.

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4. The arrangement according to claim 3,  
*characterised in that*

- the strip (4) which is glued to one floor panel (2) is made of an elastic material and is provided, in the projecting portion, with a locking pin (10) which is adapted to a locking groove (11) which is provided on the underside of the other floor panel (1) in such a manner that said locking pin (10) engages in said locking groove (11) when the long sides of the floor panels are pressed together and locks such that a motion is possible only along the long ends of said floor panels, the floor panel (1) being laterally moved until it meets the short end of another floor panel, where the joint edge (9) meets the bevelled part of said locking pin (12) which bends said strip (4) downwards to some extent such that the floor panels can abut against each other in the short end and locking occurs, whereby said floor panel (1) is mechanically locked in all directions and the floor can be laid without using glue.
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**Abstract**

Joining of thin floating hard floors. By suitable adaptation of the core of laminate, highly efficient compact laminated floors can be made which are only 3-4 mm thick. The problem is that there is no suitable method for joining thin hard floor panels. This problem has been overcome by providing a groove (3) in the underside of the short and long sides of the floor panels, a strip (4) being attached to one floor panel (1), whereupon the other floor panel (2) is laid down. By a special design of groove, strip and joint edges, floor-laying can be carried out by means of glue, double-adhesive tape and mechanical locking.

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Fig. 1

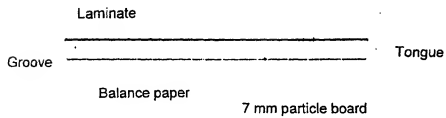


Wearing surface of melamine

Decor of melamine

Core of phenol

Particle board



Laminate

Groove

Balance paper

7 mm particle board

Tongue

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FIG. 2

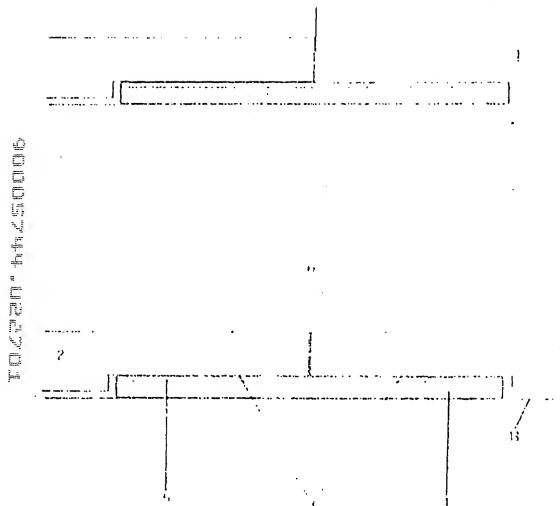


FIG. 3

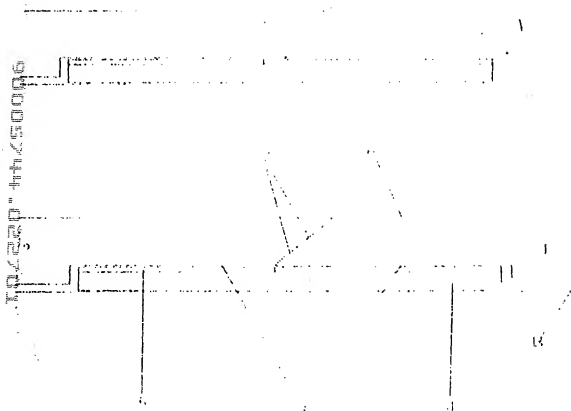


FIG. 4

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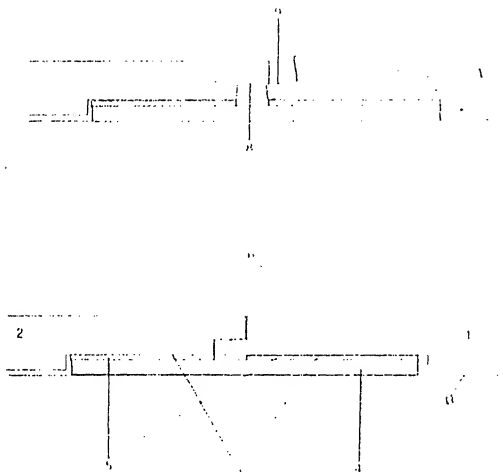
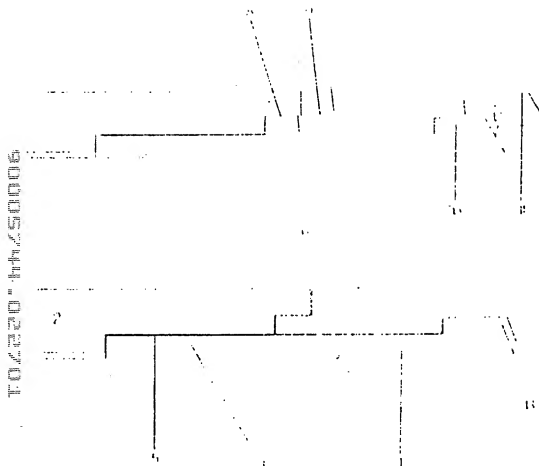




FIG. 5





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F X 089/2339-4463

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1998-07-20

AWAPATENT, Malmö



Deputy Date

17.07.98

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|---|--|
| Inventor/Ref./Ref.<br>2950761   | Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.<br>94915725.9-2303/SE9400386 |
| Anmelder/Applicant/Demandeur/Propriétaire/Propriétaire<br>VÄLING & ALUMINIUM AB |  |

COMMUNICATION UNDER RULE 51(6) EPC

Further to the communication under Rule 51(4) dated 13/05/98

your approval of the text to be used as the basis for grant has been duly received.

Insofar as you have not already fulfilled the requirements mentioned below, you are now requested within a non-extendable period of three months from notification of this communication

1. to file in duplicate translations of the claim(s) in the two other EPO official languages;

DEM SEK

- 2a. to pay the fee for grant including the fee for printing up to and including 35 pages;  
Reference 007 ..... 1400.00 6330.00

- 2b. to pay the printing fee for the 36th and each additional page; Number of pages: 0  
Reference 008 ..... 0.00 0.00

3. to pay the additional claims fee(s) (rule 51(7) EPC);

Number of claims fees payable: 3

Reference 016 ..... 240.00 1080.00

Total amount ..... 1640.00 7410.00

REGISTERED LETTER



if the equivalents are given in other currencies, then these come under the provision of possible changes in accordance with Art. 6(4) of the Rules Relating to Fees. Such changes will be published in the Official Journal.

For all payments you are requested to use EPO Form 1010 or to refer to the relevant reference number.

If additional copies of the patent specification are required, you should request this in writing and quote Fee reference code 0 5 8 when making payment.

If the grant, printing or claims fees are not paid or the translations not filed in due time, the European patent application will be deemed to be withdrawn (Rule 51(8) EPC).

#### Vote on payment of renewal fees

If a renewal fee falls due between notification of the present communication and the proposed date of publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee has been paid (Rule 51(9) EPC).

Under article 86(4) EPC, renewal fees are payable to the European Patent Office until the year in which the mention of the grant of the European patent is published.

#### Filing of translations in the Contracting States

Pursuant to Article 65(1) EPC the following designated Contracting States require a translation of the specification of the European patent in their/one of their official language(s) (Rule 51(10) EPC), in a o f a r this specification will not be published in their/one of their official language(s)

- within t h r e e months of publication of the mention of such decision:

AT AUSTRIA  
BE BELGIUM  
CH SWITZERLAND/LIECHTENSTEIN  
DE GERMANY  
DK DENMARK  
ES SPAIN  
FR FRANCE  
GB UNITED KINGDOM  
GR GREECE

Anmeldung Nr./Application No./Demande n° //Patent Nr./Patent No./Brevet n°

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90005744-02201



T ITALY  
NL NETHERLANDS  
T PORTUGAL  
E SWEDEN

within six months of publication of the mention of such decision:

E IRELAND

The date on which the European Patent Bulletin publishes the mention of the grant of the European patent will be indicated in the decision on the grant of the European patent (EPO Form 2006).

In case of a valid extension the following Extension States require a translation of the CLAIMS in their official language within three months after publication of the mention of the grant of the European patent:

AL ALBANIA  
LT LITHUANIA  
LV LATVIA  
MK MACEDONIA  
RO ROMANIA (requires translation of the specification)  
SI SLOVENIA

The translation must be filed with the national Patent Offices of the Contracting or Extension States in accordance with the provisions applying thereto in the State concerned. Further details (e. g. appointment of a national representative or indication of an address for service within the country) are given in the EPO information brochure "National law relating to the EPC", edition January 1997, and in the supplementary information published in the Official Journal of the EPO.

Failure to supply such translation to the Contracting and Extension States in time and in accordance with the requirements may result in the patent being deemed to be void ab initio in the State concerned.

Note to users of the automatic debiting procedure:

Unless the EPO receives prior instructions to the contrary, the fee(s) will be debited on the last day of the period for payment. For further details see the Arrangements for the automatic debiting procedure, Supplement to OJ EPO 06/1994.

For the Examining Division:

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Tel. No.: (+49-89) 2399-2449



[ ] The text notified under Rule 51(4) EPC has been amended by the Ex-

Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°

94915725.9

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aming Division as requested by the applicant.  
Copies of the amended pages are annexed.

- ] The text notified under Rule 51(4) EPC has been amended using the replacement pages filed by the applicant.
- ] Form 2530 relating to filing a translation of the previous application is dispatched by the same post.

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| Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n° | Blatt/Page/Feuille |
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 ☎ 069/2399-0  
 T 022 656 49mu d  
 F 069/2399-4485

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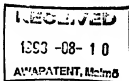
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Datum/Date

06/08/98

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|--|---|
| Anmelder/Ref.  | Anmeldung Nr./Application No./Demande n°/Patent No./Brevet n° |
| 2950761  | 94915725.9-2303 0698162                                       |
| Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire<br>VÄLING ALUMINIUM AB |   |

# DECISION TO GRANT A EUROPEAN PATENT PURSUANT TO ARTICLE 97(2) EPC

Following examination of European patent application No. 94915725.9  
 a European patent with the title and the supporting documents indicated  
 in the communication pursuant to Rule 51(4) EPC dated 13.05.98  
 is hereby granted in respect of the designated Contracting States.  
 Any modifications which were subsequently requested have been approved  
 by the Examining Division. Any corrections requested by the applicant  
 after receipt of the communication under Rule 51(6) and received at  
 the EPO on 00.00.00 have been taken into account.

Patent No. : 0698162  
 Date of filing : 29.04.94  
 Priority claimed : 10.05.93/ SE 9301595  
 Designated Contracting States : AT-BE-CH-DE-DK-ES-FR-GB-GR-IE-IT-LI-LU-  
 MC-NL-PT-SE  
 VÄLINGE ALUMINIUM AB  
 Vångavägen 48  
 260 40 Viken/SE

This decision will take effect on the date on which the European  
 Patent Bulletin mentions the grant (Art. 97(4) and (5) EPC).

The mention of the grant will be published in European Patent  
 Bulletin 98/38 of 16.09.98.

Examining Division  
 DALL'NESE D D

PAPADIMITRIOU S E

PLUGGE H B



Registered letter

EPO Form 2106 01.95

7051001 to EPO postal service: 31/07/98

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1998-09-18

AWAPATENT, Malmö

Datum/Date

17.09.98

Zeichen/Ref./Ref.

2950767

Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.

94915725.9-2303/0698162

Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire

VÄLINGE ALUMINIUM AB

TRANSMISSION OF THE CERTIFICATE FOR A EUROPEAN PATENT  
PURSUANT TO RULE 54 (1) EPC

The certificate for a European patent, with the  
specification annexed thereto, is enclosed herewith.

G. TERNIEDEN  
Formalities Officer  
Tel.No.: (+49-89) 2399-4440





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# Urkunde Certificate Certificat

Es wird hiermit bescheinigt, daß für die in der beigefügten Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

It is hereby certified that a European patent has been granted in respect of the invention described in the annexed patent specification for the Contracting States designated in the specification.

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet ci-joint, pour les Etats contractants désignés dans le fascicule de brevet.

Europäisches Patent Nr.

European Patent No.

Brevet européen n°

0698162

Patentinhaber

Proprietor of the Patent

Titulaire du brevet

VÄLINGE ALUMINIUM AB  
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260 40 Viken/SE

München, den  
Munich,  
Fait à Munich, le

16.09.98

Ingo Kober

Präsident des Europäischen Patentamts  
President of the European Patent Office  
Président de l'Office européen des brevets

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(11)

EP 0 698 162 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention  
of the grant of the patent:  
16.09.1996 Bulletin 1996/38

(51) Int Cl.<sup>6</sup> E04F 15/14, E04F 15/02,  
E04F 13/08

(21) Application number: 94915725.9

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PCT/SE94/00386

(22) Date of filing: 29.04.1994

(87) International publication number:  
WO 94/26999 (24.11.1994 Gazette 1994/26)

(54) SYSTEM FOR JOINING BUILDING BOARDS

VERBINDUNGSSYSTEM FÜR GEBÄUDEPLATTEN

SYSTEME D'ASSEMBLAGE DE PANNEAUX DE CONSTRUCTION

(84) Designated Contracting States:  
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL  
PT SE

(72) Inventor: PERVAN, Tony  
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(30) Priority: 10.05.1993 SE 9301595

(74) Representative: Andersson, Per-Olof et al  
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(43) Date of publication of application:  
28.02.1996 Bulletin 1996/09

(60) Divisional application: 98106535.2 / 0 855 482  
98201555.4

(56) References cited:  
WO-A-93/13280 DE-A- 2 616 077  
FR-A- 1 293 043 US-A- 3 538 665

(73) Proprietor: VÄLINGE ALUMINIUM AB  
260 40 Viken (SE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

1062220-44/50006

EP 0 698 162 B1

floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to an uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is no viable alternative either. Especially, biased clips of this type cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in connection with laying, since the clips urge the panels tightly against each other.
- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used
- The floor panels can be joined together only at their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness than present-day floor panels.

A particular object of the invention is to provide a panel-joining system which

- makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily on mechanical connections between

the panels;

- can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
- makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- reduces tool wear when manufacturing floor panels with hard surface layers;
- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction, parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in that the locking device further comprises a strip integrated with the other of said panels, termed strip panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with its locking element received in the locking groove of the groove panel, that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and is operative in said second mechanical connection, that the first and the second mechanical connection

to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

The above and other features and advantages of the invention will appear from the appended claims and the following description of embodiments of the invention.

The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

#### Description of Drawing Figures

Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

Figs 4a and 4b show a floor panel according to Figs 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

#### Description of Preferred Embodiments

Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the

invention, the panels 1, 2 normally being identical in practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1 having a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint edges 3, 4 have been brought into complete engagement with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip panel 1, the projecting part of the strip 6 thus forming an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extend-

ing throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of panels in all four directions with respect to the initial position.

## Claims

1. A system for providing a joint along adjacent joint edges (3, 4) of two building panels (1, 2), especially floor panels, in which joint:

the adjacent joint edges (3, 4) together form a first mechanical connection locking the joint edges (3, 4) to each other in a first direction (D1) at right angles to the principal plane of the panels (1, 2), and a locking device (6, 8, 14) arranged on the rear side (18, 16) of the panels (1, 2) forms a second mechanical connection locking the panels (1, 2) to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4), said locking device (6, 8, 14) comprising a locking groove (14) which extends parallel to and spaced from the joint edge (4) of one (2) of said panels, termed groove panel, and which is open at the rear side (18)

14. A system as claimed in any one of claims 1-4, **characterised** in that the strip (6) is integrally formed with the strip panel (1), i.e. made in one piece with the strip panel (1).

15. A system as claimed in any one of the preceding claims, **characterised** in that the locking element (11) consists of a locking edge extended continuously along the strip (6).

16. A system as claimed in any one of claims 1-14, **characterised** in that the locking element (8) consists of a plurality of spaced-apart locking elements distributed throughout the length of the strip (6).

17. A system as claimed in any one of the preceding claims, **characterised** in that the panels (1, 2) are rectangular and intended, at each of their four edges (3, 4, 3', 4'), to be joined to a similar panel by a first mechanical connection of the aforementioned type and a second mechanical connection of the aforementioned type, each panel having a first pair of opposite joint edges (3, 4), one of which is provided with a strip (6) of the aforementioned type and the other of which is provided with a locking groove (14) of the aforementioned type, and a second pair of opposite joint edges (3', 4'), one of which is provided with a strip (6') of the aforementioned type and the other of which is provided with a locking groove (14') of the aforementioned type.

18. A system as claimed in any one of the preceding claims, **characterised** in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels.

19. A system as claimed in claim 18, **characterised** in that the underlay (46) is fixed so as to cover the strip (6) in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels is offset in said second direction relative to the joint edges (3, 4).

20. A system as claimed in any one of the preceding claims, **characterised** in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip between the locking element (8) and the joint edge (3) of the strip panel to seal against the groove panel (2).

21. A system as claimed in any one of the preceding claims, **characterised** in that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element (8) to enter the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper corner

part of the joint edge (4) of the groove panel (2) in contact with the upper corner part of the joint edge (3) of the strip panel (1).

22. A system as claimed in any one of the preceding claims, **characterised** in that the first mechanical connection as well as the second mechanical connection are such that they allow the locking element (8) to leave the locking groove (14) if the groove panel (2) is turned about its joint edge (4) angularly away from the strip (6) while holding the upper corner part of the joint edge (4) of the groove panel (2) in contact with the upper corner part of the joint edge (3) of the strip panel (1).

# Patentanprüche

1. Ein System zur Bereitstellung einer Verbindung entlang angrenzender Verbindungskanten (3, 4) zweier Gebäudeplatten (1, 2), insbesondere Bodenplatten, wobei bei der Verbindung:

zwei angrenzende Verbindungskanten (3, 4) zusammen eine erste, mechanische, Verbindung bilden, die die Verbindungskanten (3, 4) aneinander in einer ersten Richtung (D1)) unter rechten Winkeln zu der Hauptebene der Platten (1, 2) verriegelt, und

eine auf der Rückseite (18, 16) der Platten (1, 2) angeordnete Verriegelungseinrichtung (6, 8, 14) eine zweite mechanische Verbindung bildet, die die Platten (1, 2) miteinander in einer zweiten Richtung (D2) parallel zu der Hauptebene und unter rechten Winkeln zu den Verbindungskanten (3, 4) verriegelt, wobei die genannte Verriegelungseinrichtung (6, 8, 14) eine Verriegelungsnut (14) umfaßt, die sich parallel zu und von der Verbindungskante (4) einer (2) der genannten Platten, Nutenplatte genannt, beabstandet erstreckt und die auf der Rückseite (16) der Nutenplatte (2) offen ist, **dadurch gekennzeichnet,**

daß die Verriegelungseinrichtung (6, 8, 14) des weiteren einen Streifen (6) umfaßt, der mit der anderen (1) der genannten Platten, Streifenplatte genannt, integriert ist, wobei sich der genannte Streifen (6) im wesentlichen über die gesamte Länge der Verbindungskante (3) der Streifenplatte (1) erstreckt und mit einem Verriegelungselement (8) versehen ist, das von dem Streifen so hervorsteht, daß, wenn die Platten miteinander verbunden sind, der Streifen (6) auf der Rückseite der Nutenplatte (2) hervorsteht, wobei sein Verriegelungselement (8) in der Verriegelungsnut (14) der Nutenplatte

Ähnliches (60) umfaßt, die von dem Streifen (6) gebogen oder ausgestanzt sind und die gegen gegenüberliegende Innenseiten der Vertiefung (58) drücken.

12. Ein System, wie in irgendeinem der Ansprüche 5-11 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) an der Streifenplatte (1) mittels eines Binders befestigt ist.

13. Ein System, wie in irgendeinem der Ansprüche 5-12 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) aus einem flexiblen, vorzugsweise elastischen Material hergestellt ist, wie Aluminiumblech.

14. Ein System, wie in irgendeinem der Ansprüche 14 beansprucht, **dadurch gekennzeichnet**, daß der Streifen (6) einstückig mit der Streifenplatte (1) gebildet ist, d.h. als ein Stück mit der Streifenplatte (1) hergestellt ist.

15. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß das Verriegelungselement (8) aus einer Verriegelungskarte besteht, die sich fortlaufend entlang dem Streifen (6) erstreckt.

16. Ein System, wie in irgendeinem der Ansprüche 1-14 beansprucht, **dadurch gekennzeichnet**, daß das Verriegelungselement (8) aus einer Mehrzahl abwechselnder Verriegelungselemente besteht, die über die Länge des Streifens (6) verteilt sind.

17. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die Platten (1, 2) rechteckig sind und an jeder ihrer vier Kanten (3, 4, 3', 4') mit einer ähnlichen Platte durch eine erste, mechanische Verbindung der vorgenannten Art und eine zweite, mechanische Verbindung der vorgenannten Art verbunden werden sollen, wobei jede Platte ein erstes Paar gegenüberliegender Verbindungskanten (3, 4), von denen eine mit einem Streifen (6) der vorgenannten Art versehen ist und die andere mit einer Verriegelungsnut (14) der vorgenannten Art versehen ist, und ein zweites Paar gegenüberliegender Verbindungskanten (3', 4') aufweist, von denen eine mit einem Streifen (6') der vorgenannten Art versehen ist und die andere mit einer Verriegelungsnut (14') der vorgenannten Art versehen ist.

18. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß eine Unterlage (46) aus Bodenbreitern, Schaumstoff, Filz oder Ähnlichem an den Rückseiten (18, 16) der Platten befestigt ist.

19. Ein System, wie in Anspruch 18 beansprucht, **dadurch gekennzeichnet**, daß die Unterlage (16) so befestigt ist, daß sie den Streifen (6) in der genannten zweiten Richtung wenigstens bis zu dem Verriegelungselement (8) überdeckt, so daß eine Verbindung zwischen den Unterlagen (46) zweier angrenzender Platten in der genannten zweiten Richtung in bezug auf die Verbindungskanten (3, 4) versetzt ist.

20. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß eine Dichtungseinrichtung, wie eine Dichtmasse, ein Gummistreifen oder Ähnliches, auf der Vorderseite (22) des Streifens zwischen dem Verriegelungselement (8) und der Verbindungskante (3) der Streifenplatte vorgesehen ist, um gegenüber der Nutenplatte (2) abzudichten.

21. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die erste, mechanische Verbindung sowie die zweite, mechanische Verbindung derart sind, daß sie dem Verriegelungselement (8) erlauben, in die Verriegelungsnut (14) einzutreten, wenn die Nutenplatte (2) um ihre Verbindungskante (4) winkelmäßig in Richtung zu dem Streifen (6) herumgedreht wird, während der obere Eckteil der Verbindungskante (4) der Nutenplatte (2) mit dem oberen Eckteil der Verbindungskante (3) der Streifenplatte (1) in Berührung gehalten wird.

22. Ein System, wie in irgendeinem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet**, daß die erste, mechanische Verbindung sowie die zweite, mechanische Verbindung derart sind, daß sie dem Verriegelungselement (8) erlauben, die Verriegelungsnut (14) zu verlassen, wenn die Nutenplatte (2) um ihre Verbindungskante (4) winkelmäßig von dem Streifen (6) fort herumgedreht wird, während der obere Eckteil der Verbindungskante (4) der Nutenplatte (2) mit dem oberen Eckteil der Verbindungskante (3) der Streifenplatte (1) in Berührung gehalten wird.

#### Revendications

1. Système de formation d'un joint le long de bords adjacents (3, 4) de joint de deux panneaux de construction (1, 2), notamment de panneaux de sol, le joint étant tel que :

les bords adjacents (3, 4) de joint forment ensemble une première connexion mécanique qui bloque les bords (3, 4) de joint l'un par rapport à l'autre dans une première direction (D1) qui est perpendiculaire au plan principal des

s sisle (52) délimité par deux cavités (24, 50) à la face arrière (18) du panneau à bande, et des languettes, des lèvres ou analogues (54, 56) qui sont courbées ou poinçonnées dans la bande (6) et qui exercent une pression contre les côtés externes opposés du bord de saisie (52).

11. Système selon la revendication 9, caractérisé en ce que la connexion mécanique entre la bande (6) et le panneau à bande (1) comporte une cavité (58) formée à la face arrière (18) du panneau à bande, et des languettes, lèvres ou analogues (60) qui sont courbées ou poinçonnées dans la bande (6) et qui exercent une pression contre les côtés internes opposés de la cavité (58).

12. Système selon l'une quelconque des revendications 5 à 11, caractérisé en ce que la bande (6) est fixée au panneau à bande (1) par un liant.

13. Système selon l'une quelconque des revendications 5 à 12, caractérisé en ce que la bande (6) est formée d'un matériau souple, de préférence élastique, tel qu'une feuille d'aluminium.

14. Système selon l'une quelconque des revendications 1 à 4, caractérisé en ce que la bande (6) est formée solidairement avec le panneau à bande (1), c'est-à-dire en une seule pièce avec le panneau à bande (1).

15. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que l'élément de blocage (8) est constitué d'un bord de blocage qui s'étend de façon continue le long de la bande (5).

16. Système selon l'une quelconque des revendications 1 à 14, caractérisé en ce que l'élément de blocage (8) est constitué de plusieurs éléments espacés de blocage répartis sur toute la longueur de la bande (5).

17. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que les panneaux (1, 2) sont rectangulaires et sont destinés, à chacun de leurs quatre bords (3, 4, 3', 4'), à être raccordés à un panneau analogue par une première connexion mécanique du type précité et une seconde connexion mécanique du type précité, chaque panneau ayant une première paire de bords opposés de joint (3, 4) dont l'un a une bande (6) du type précité et l'autre a une gorge de blocage (14) du type précité, et une seconde paire de bords opposés de joint (3', 4') dont l'un a une bande (6) du type précité et l'autre a une gorge de blocage (14') du type précité.

18. Système selon l'une quelconque des revendications précédentes, caractérisé en ce qu'une sous-couche (46) de panneaux de sol, de mousse, de feutre ou analogue est fixée aux faces arrière (18, 16) des panneaux.

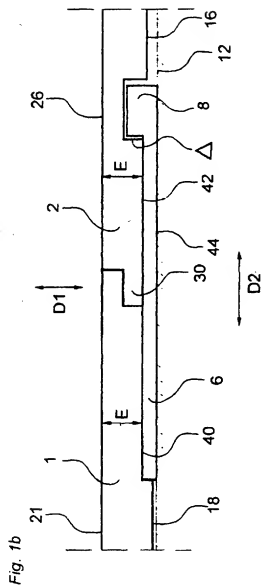
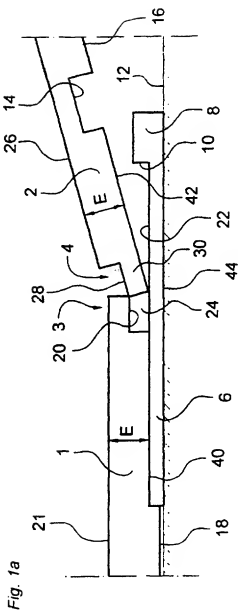
19. Système selon la revendication 18, caractérisé en ce que la sous-couche (46) est fixée afin qu'elle couvre la bande (6) dans la seconde direction au moins jusqu'à l'élément de blocage (8), si bien qu'un joint formé entre les sous-couches (46) des deux panneaux adjacents est décalé dans la seconde direction par rapport aux bords de joint (3, 4).

20. Système selon l'une quelconque des revendications précédentes, caractérisé en ce qu'un dispositif d'étanchéité, tel qu'une composition d'étanchéité, une bande de caoutchouc ou analogue, est placée à la face avant (22) de la bande entre l'élément de blocage (8) et le bord de joint (3) du panneau à bande afin que l'étanchéité soit assurée contre le panneau à gorge (2).

21. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que la première connexion mécanique et la seconde connexion mécanique sont telles qu'elles permettent à l'élément de blocage (8) de pénétrer dans la gorge de blocage (14) lorsque le panneau à gorge (2) est tourné angulairement autour de son bord de joint (4) vers la bande (6) avec retenue de la partie supérieure de coin du bord de joint (4) du panneau à gorge (2) au contact de la partie supérieure de coin du bord de joint (3) du panneau à bande (1).

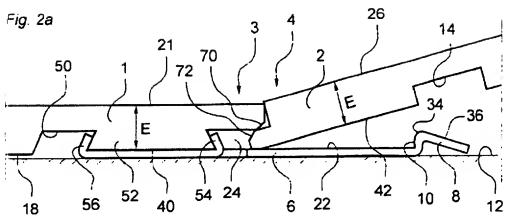
22. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que la première connexion mécanique et la seconde connexion mécanique sont telles qu'elles permettent à l'élément de blocage (8) de quitter la gorge de blocage (14) lorsque le panneau à gorge (2) est tourné angulairement autour de son bord de joint (4) en s'écartant de la bande (6) avec retenue de la partie supérieure de coin du bord de joint (4) du panneau à gorge (2) au contact de la partie supérieure de coin du bord de joint (3) du panneau à bande (1).

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**Fig. 2a**



**Fig. 2b**

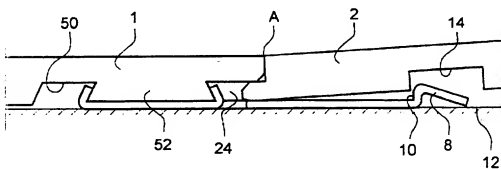


Fig. 2c

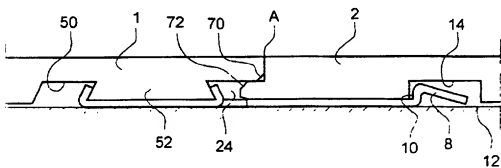


Fig. 3a

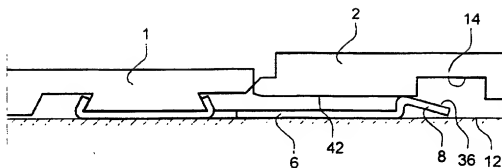


Fig. 3b

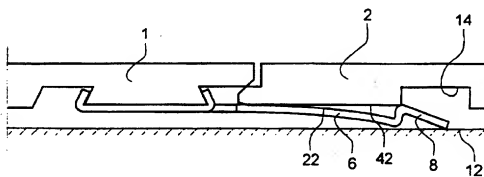


Fig. 3c

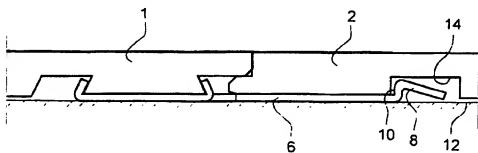


Fig. 4a

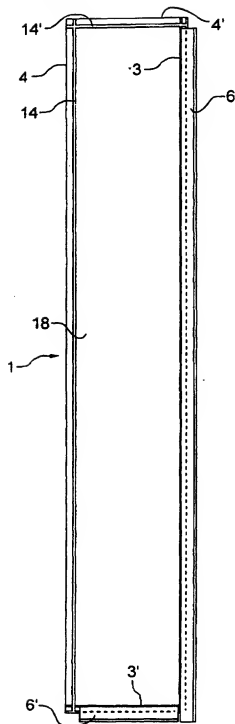


Fig. 4b

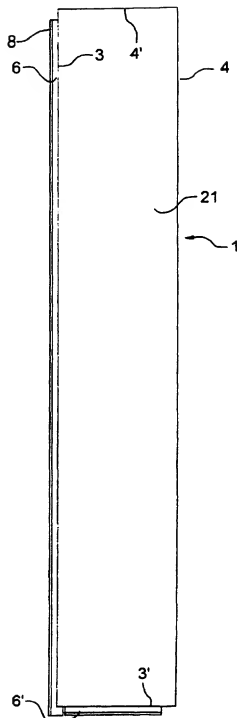


Fig. 5

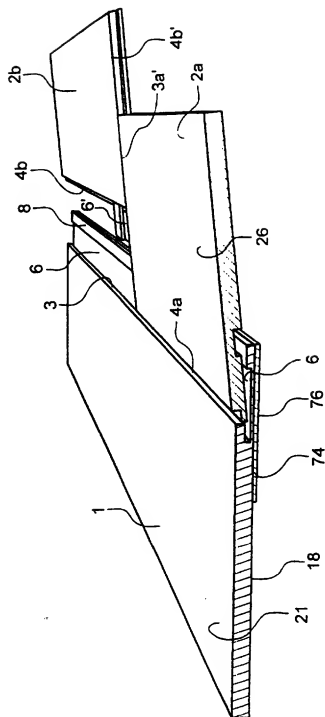


Fig. 6

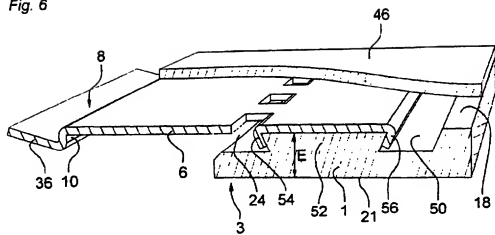


Fig. 7

